

ENVIRONMENTAL ASSESSMENT OF PROPOSED MIXED-USE BUSINESS PARK ON AN ENHANCED USE LEASE AT GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

Prepared for



Grand Forks Air Force Base

April 2014

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**ENVIRONMENTAL ASSESSMENT OF
PROPOSED MIXED-USE BUSINESS PARK
ON AN ENHANCED USE LEASE AT
GRAND FORKS AIR FORCE BASE,
NORTH DAKOTA**



Grand Forks Air Force Base
Air Force Civil Engineer Center

April 2014

FINDING OF NO SIGNIFICANT IMPACT AND FINDING OF NO PRACTICABLE ALTERNATIVE

PROPOSED MIXED-USE BUSINESS PARK ON AN ENHANCED USE LEASE AT GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

Pursuant to provisions of the National Environmental Policy Act, 42 United States Code (USC) 4321 to 4270d, the implementing Council on Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) 1500-1508, and 32 CFR Part 989, Environmental Impact Analysis Process (EIAP), the United States (US) Air Force (Air Force) assessed the potential environmental consequences of activities associated with the development of a mixed-use business park by Grand Forks County (County) under the Air Force Enhanced Use Lease (EUL) Program under authority of 10 USC §2667 on an underutilized, non-excess portion of Grand Forks Air Force Base (GFAFB), North Dakota (ND). The environmental assessment (EA) prepared during the EIAP is hereby incorporated by reference.

BACKGROUND

GFAFB proposes to lease approximately 217 acres to the County for the purpose of developing, constructing and operating a mixed-use business park. The County will develop the business park to support research and development, testing and evaluation, and operations of unmanned aerial systems (UAS), as well as activities centered on the development of sensor technology and data management. The County will work with private developers to create a business park that will offer some of the advantages of proximity to an Air Force base with the flexibility of a private development.

The purpose of the mixed-use business park will be to serve as a focal point for partnerships with other communities, academic institutions and public and private organizations where remotely piloted aircraft (RPA), sensor development, and data management are underway. In 2010, the 9th Reconnaissance Wing and its Global Hawk UAS mission was assigned to GFAFB. The Department of Homeland Security Customs and Border Protection has UAS operations and the University of North Dakota has UAS training at GFAFB as well. Developing this business park at GFAFB may promote partnerships that could help reduce costs, improve readiness and help fill the growing need for UAS pilots, maintenance technicians, sensor operators and developers, and data analysts and managers. The need for the proposed action is as an economic generator for the County and the region by creating jobs and expanding the tax base.

PROPOSED ACTION AND ALTERNATIVES

The proposed action involves the development, construction, and operation of a mixed-use business park on land leased by Grand Forks County from the Air Force at GFAFB. The County will work with private developers to create a mixed-use business park that will support research and development, testing and evaluation, training and operations of UAS, as well as activities centered on the development of sensor technology and data management.

In addition, the County will, subject to any required Air Force approvals, conditions or restrictions, reconnect the existing taxiway from the former aviation parking ramp to the operational runway. Individual tenants approved by the County will need to specifically request Air Force permission and approval to use the taxiway and runway to launch and recover RPA. The proposed action was analyzed to include the launch and recovery of up to 100 RPA sorties per month (averaging 3 to 4 per day), subject to necessary Air Force Strategic Basing Guidelines, evaluations, approvals, conditions or restrictions, and Federal Aviation Administration (FAA) regulations. If granted all necessary Air Force permissions, business park tenants will conduct RPA sorties that consist of launch, climbing to an operational altitude, flying at altitude, and returning to base. No live munitions will be carried by the RPA. Further, if approval or permission is granted by the Air Force but launch and recovery of RPA sorties differs from the analysis conducted in this EA then additional Air Force environmental impact analysis process (EIAP) will be necessary prior to conducting any RPA activity.

Initial planning of the proposed action evaluated several locations throughout the base that met or nearly met the selection standards. Ultimately, only one acceptable parcel was identified to evaluate further. The EA evaluates the potential impacts of two action alternatives to the proposed action and the no action alternative on air quality, water resources, biological resources, cultural resources, hazardous materials and wastes, geology and soils, land use, noise, transportation, utilities, socioeconomics, environmental justice, and occupational health and safety. The only difference between the two alternatives is the layout of the buildings and roads. Following the Jurisdictional Determination of waters of the United States (US), including wetlands, by the US Army Corps of Engineers (USACE), the County proposed a second conceptual layout of the business park in order to minimize wetland loss to the maximum extent practicable; this revised layout is analyzed as Alternative 2.

SUMMARY OF FINDINGS

Impacts resulting from the proposed action will come from construction and operation of the business park and potential flight operations. Minor construction impacts will include construction air emissions, runoff and sedimentation of disturbed soils, noise from construction equipment, and potential risks to occupational health and safety of the construction workers. Adverse but less than significant impacts to wetlands, grasslands, and migratory birds would result from the proposed action subject to compliance with stipulated mitigation measures in the EA Mitigation Plan. A summary of the impacts is in Table 2-3 of the Final EA. Using a conceptual site layout plan, Alternative 1 will result in adverse impacts on 4.675 acres of jurisdictional and 5.556 acres of isolated wetlands. In addition, 1.386 acres of jurisdictional and 2.807 acres of isolated wetlands will likely be disturbed during construction of the development, but will be re-established when construction in that area is completed. USACE requires that disturbance to wetlands be mitigated by avoidance, minimization, replacement, or compensation, in that order. The County submitted a revised conceptual site layout plan that avoided several jurisdictional and isolated wetlands and then minimized, to the maximum extent practicable, any remaining disturbance to wetlands. This revised layout was assessed as Alternative 2 and will result in permanent impacts to 0.3135 acres of jurisdictional and 0.4964 acres of isolated wetlands. In addition, 0.7380 acres of jurisdictional and 0.8029 acres of isolated wetlands will likely be disturbed during construction. Because the site plans are conceptual at this time and may change depending on the needs of the individual tenants, the EA evaluates the potential impacts of construction on 1 acre of jurisdictional and 1 acre of isolated wetlands. If subsequent or actual site plans generate different impacts to wetlands or other environmental resources than were analyzed in this Final EA then supplemental Air Force EIAP will be necessary prior to implementing the plans.

Operational impacts for both alternatives will include some continuing air emissions, minor usage of hazardous materials and generation of hazardous wastes, noise from potential RPA flights, impacts on traffic that will grow as the development grows, use of area utilities, beneficial impacts on the socioeconomic resources of the region, with minor temporary impacts on an existing housing shortage, and some potential risk to Air Force personnel and tenants from the potential increase in RPA flight operations. All of these impacts along with incorporation of the mitigation actions and measures presented in the EA's, Appendix C Mitigation Plan will be less than significant.

Also, prior to completion of this Final EA, the Air Force notified applicable federal, state, and local governmental agencies (See Final EA, Appendix A) for their comments and questions on the proposed project. Additionally, a 30-day public comment period and a Notice of Availability (NOA) for the Draft EA was published which solicited questions or comments prior to completing the Final EA and Mitigation Plan. Further, the Air Force accomplished its requirements under the National Historic Preservation Act (NHPA), Section 106 by contacting the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officer (SHPO), and federally listed or affiliated Native American tribes or their Tribal Historic Preservation Officers (THPOs) affording them the opportunity to comment or discuss the project, or, soliciting the opportunity to consult with tribal representatives. The ACHP provided guidance and the SHPO determined there would not be any adverse effects to cultural or historic properties or resources. The Cheyenne River Sioux Tribe (CRST) requested consultation with the Air Force and also requested participation of the following tribes, Standing Rock Sioux Tribe (SRST), Sisseton-Wahpeton Ovate (SWO) and The Spirit Lake Tribe (SLT), hereafter referred to as the "Tribes" for this discussion. Government to Government consultations did occur between GFAFB and the Tribes which resulted in a Memorandum of Understanding (MOU). Documentation reflecting the Air Force's activities pursuant to agency notices, the

public comment period, and actions under the NHPA are discussed in greater detail in the Final EA and supporting documentation is located in Appendix B.

MITIGATION

Due to the fill of more than 0.5 acres of wetlands, the County, with assistance from the Air Force, will obtain an individual permit under Section 404 of the Clean Water Act. The USACE permit will stipulate the mitigation measures needed for the County's compliance with Section 404; however, after wetland impact avoidance, USACE might request onsite enhancement of existing wetlands, which will be built into the actual site plans.

A summary of mitigation measures incorporated into the proposed action to reduce potentially significant impacts to less than significant or to minimize environmental impacts is in Table 2-4 of the Final EA and provided herein.

A draft Mitigation Plan detailing these mitigation measures is in Appendix C of the EA. By implementing the mitigations identified in the Final EA, the impacts from the proposed action will be less than significant.

PREFERRED ALTERNATIVE

The preferred alternative for the proposed action is Alternative 2, because of its reduced impact on wetlands from Alternative 1.

Summary of project features that mitigate environmental consequences

Potential Impact	Mitigation Measures by Grand Forks County
Water Resources	
• Avoid degradation of water quality from project construction activities	<ul style="list-style-type: none">• Obtain coverage under ND's NPDES General Permit for Stormwater Discharge Associated with Construction Activities• Prepare and follow a site-specific Storm Water Pollution Prevention Plan
• Avoid or minimize disturbance or loss of wetlands in project area	<ul style="list-style-type: none">• Reduce and relocate building footprints within project area to avoid as many ac of wetlands as practicable• During construction, flag/stake wetland boundaries to keep workers from disturbing wetlands• Mitigate for wetland loss by enhancing an existing wetland or wetlands within the project boundaries.• Obtain a CWA Section 404 permit (with cooperation from GFAFB) from the USACE. Comply with mitigation measures required by the USACE in their CWA Section 404 permit
• Comply with stormwater management requirements under Section 438 of the EISA	<ul style="list-style-type: none">• Use low-impact development techniques to maintain the pre-construction hydrology
• Comply with North Dakota Department of Health Construction and Environmental Disturbance Requirements	<ul style="list-style-type: none">• Prevent erosion of exposed soil surfaces and trapping sediments being transported.• Control stream bank and stream bed disturbances to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. Coordinate use of pesticides or herbicides with those accepted for use by GFAFB on the installation• Fill placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds. Debris and solid waste will be properly removed and impacted areas restored as nearly as possible to the original condition.
Biological Resources	
• Potential impact on migratory birds that	<ul style="list-style-type: none">• If practicable, time construction in the grassland area to

Potential Impact	Mitigation Measures by Grand Forks County
lay over or nest in project area	<p>avoid the primary nesting season April 15 to July 15 (Migratory Bird Treaty Act and the INRMP)</p> <ul style="list-style-type: none"> To avoid construction delays, conduct preconstruction surveys to look for and avoid any nesting grassland birds or bald eagles (in trees). If nests are located in the area, consult with USFWS for mitigation Maintain native prairie/grassland in areas of the lease that do not need to be disturbed until later phases of construction Reseed disturbed grassland areas as soon as possible with native grassland seed mixes
<ul style="list-style-type: none"> Potential impact on populations of lady's slipper orchids documented in the northwest corner of the project area 	<ul style="list-style-type: none"> Before preparing the plans for development of the northwestern-most parcel of the project area, conduct surveys for white and yellow lady's slipper orchids and avoid disturbing the existing population to the maximum extent practicable Herbicide application will not be conducted in areas where white or yellow lady's slipper occurs
Cultural Resources	
<ul style="list-style-type: none"> If cultural resources are discovered during construction 	<ul style="list-style-type: none"> Halt construction and immediately notify the GFAFB EUL Project Coordinator and/or Cultural Resources Manager of the discovery in order to accurately identify and assess the discovery and to generate appropriate responses based on applicable federal laws, regulations and policies Follow stipulations of the MOU between affected Tribes and the Air Force, provided the MOU is applicable to the assessed cultural resources discovery.
Hazardous Materials and Waste	
<ul style="list-style-type: none"> Use of hazardous materials and generation of hazardous wastes at the business park by the County or tenants 	<ul style="list-style-type: none"> Prepare a Hazardous Waste Management Plan that would stipulate the processes and procedures for managing, transporting, handling, storing, treating and disposing of hazardous materials and/or hazardous waste and substances generated within the business park activities
<ul style="list-style-type: none"> Grand Forks County has an average indoor radon screening level above the USEPA radon guideline of 4 pCi/L. 	<ul style="list-style-type: none"> Buildings to be designed to reduce radon penetration to the interiors.
Transportation	
<ul style="list-style-type: none"> Potential change in traffic patterns 	<ul style="list-style-type: none"> Ensure that NDDOT adds turn lanes to US-2 at the entrance to the development to prevent potential traffic slowdowns on the highway
Utilities	
<ul style="list-style-type: none"> Impacts due to increased utility usage 	<ul style="list-style-type: none"> Design and construct buildings to meet the requirements for LEED Silver certification and incorporate as many energy and water conservation initiatives as practicable

ND=North Dakota; NPDES=National Pollutant Discharge Elimination System; GFAFB=Grand Forks Air Force Base; USACE=United States Army Corps of Engineers; EISA=Energy Independence and Security Act; INRMP=Integrated Natural Resources Management Plan; USFWS=United States Fish and Wildlife Service; EUL=Enhanced Use Lease; MOU=Memorandum of Understanding; USEPA=US Environmental Protection Agency; pCi/L=picoCuries per liter; NDDOT=North Dakota Department of Transportation; LEED=Leadership in Energy and Environmental Design

FINDING OF NO PRACTICABLE ALTERNATIVE

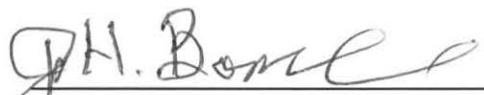
Pursuant to Executive Order 11990, Air Force regulation 32 CFR 989.14(g), Air Force delegations of authority, and, in consideration of the findings of the EA, incorporated herein, I find that there is no practicable alternative to conducting the proposed action construction activities in wetlands and that Alternative 2 and the Mitigation Plan includes all practicable measures to minimize harm to the wetlands.

FINDING OF NO SIGNIFICANT IMPACT

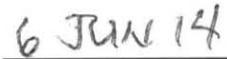
Based on my review of the facts and analysis contained in this EA, which are incorporated herein, I conclude the implementation of the preferred alternative (Alternative 2) at GFAFB will not have significant

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analysis contained in this EA, which are incorporated herein, I conclude the implementation of the preferred alternative (Alternative 2) at GFAFB will not have significant impacts on the environment, alone or when considered cumulatively with other proposed actions at the installation. Accordingly, an Environmental Impact Statement will not be required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process, and an Environmental Impact Statement will not be prepared.



JOHN H. BONAPART, JR.
SES, DAFC
Director, Installations and Mission Support



Date

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COVER SHEET

ENVIRONMENTAL ASSESSMENT – PROPOSED MIXED-USE BUSINESS PARK ON AN ENHANCED USE LEASE AT GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

Lead Agency: United States (US) Air Force

Proposed Action: Development of a Mixed-Use Business Park by Grand Forks County on an Enhanced Use Lease at Grand Forks Air Force Base, North Dakota

Written comments and inquiries regarding this document should be directed to:

Ms. Jean Reynolds,
AFCEC/CZN,
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Lackland AFB, TX 78236-9853

Report Designation: Environmental Assessment

Abstract: This environmental assessment (EA) evaluates the potential environmental impacts of activities associated with the development of a mixed-use business park by Grand Forks County (County) under the United States (US) Air Force Enhanced Use Lease (EUL) Program under authority of 10 US Code §2667 on an underutilized, non-excess portion of Grand Forks Air Force Base (GFAFB), North Dakota (ND). GFAFB proposes to lease approximately 217 acres (ac) to the County for the purpose of developing, constructing, and operating a mixed-use business park. The County would construct and develop the business park to support research and development, testing and evaluation, and operations of unmanned systems, as well as activities centered on the development of sensor technology and data management.

The activities associated with the proposed action include development, construction, and operation of the proposed mixed-use business park upon execution of a 50-year land lease. The proposed action also includes the use of unmanned aerial systems (UAS) to launch and recover remotely piloted aircraft (RPA) subject to notice to the County, written request to the Air Force for its review, and approval and compliance with Federal Aviation Administration (FAA) regulations. The EA evaluates the potential impacts of two action alternatives to the proposed action and the no action alternative on air quality, water resources, biological resources, cultural resources, hazardous materials and wastes, geology and soils, land use, noise, transportation, utilities, socioeconomic, environmental justice, and occupational health and safety. The only difference between the two alternatives is the layout of the buildings and roads. The County proposed a second layout of the business park in order to minimize wetland loss to the maximum extent practicable; this revised layout is analyzed as Alternative 2. The EA will help decision-makers decide if a Finding of No Significant Impact (FONSI) can be issued for either alternative, or if an Environmental Impact Statement (EIS) needs to be prepared. The EA will also support the Finding of No Practicable Alternative for the disturbance of both jurisdictional and non-jurisdictional wetlands.

Minor construction impacts would occur under both alternatives including construction air emissions, potential impacts on migratory birds or other bird species of concern, runoff and sedimentation of disturbed soils, noise from construction equipment, and potential risks to cultural resources and occupational health and safety of the construction workers. These impacts would be less than significant. Alternative 1 would have a loss of approximately 4.675 ac of jurisdictional and 5.556 ac of isolated wetlands whereas the revised layout of Alternative 2 would have a loss of approximately 0.3135 ac of jurisdictional and 0.4964 ac of isolated wetlands. Because the layout plans submitted for evaluation in this EA are conceptual and subject to change, the Air Force is evaluating the impacts of up to 1 acre of jurisdictional wetland permanent impact, 1 acre of isolated wetland permanent impact, and the potential temporary construction impacts within 15 feet around the permanent structures. A Memorandum of Understanding (MOU) was prepared after consultations between the pertinent Tribes and the Air Force that specifies measures to be taken to resolve any issues if resources of cultural or religious significance are discovered or identified pursuant to applicable National Register of Historic Places (NRHP) regulations.

Operational impacts would be the same under both alternatives and include some continuing air emissions, minor usage of hazardous materials and generation of hazardous wastes, noise from potential RPA flights, impacts on traffic that would grow as the development grows, use of area utilities, beneficial impacts on the socioeconomic resources of the region, and some potential risk to Air Force personnel and tenants from the potential increase in RPA flight operations. All of the operational impacts would be less than significant.

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/m ³	microgram(s) per cubic meter of air
AADT	annual average daily traffic
ABW	Air Base Wing
ACHP	Advisory Council on Historic Preservation
ac	acre(s)
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
AOC	Area of Concern
APE	area of potential effect
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
ARPA	Archaeological Resources Protection Act
ARW	Air Refueling Wing
ATFP	anti-terrorism/force protection
BASH	bird aircraft strike hazard
BCC	Bird(s) of Conservation Concern
bhp	brake horsepower
BMP	Best Management Practice
BRAC	Base Realignment and Closure
BRHC	Blue Ribbon Housing Commission
C&D	construction and demolition
CAA	Clean Air Act
CARB	California Air Resources Board
CBP	Department of Homeland Security Customs and Border Protection
CCR	Conditions, Covenants, and Restrictions
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
COA	Certificate of Authorization
CRM	Cultural Resource Manager
CRST	Cheyenne River Sioux Tribe
CWA	Clean Water Act
CZ	Clear Zone
dB	decibel(s)
dB(A)	A-weighted decibel(s)
DGS	Distributed Ground Station
DNL	day-night sound level
DOD	Department of Defense
DODI	Department of Defense Instruction
DOE-EIA	Department of Energy – Energy Information Administration
DOPAA	Description of Proposed Action and Alternatives
DOT	Department of Transportation
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	executive order
EODA	Explosive Ordnance Detonation Area
ERP	Environmental Restoration Program

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

ESA	Endangered Species Act
EUL	Enhanced Use Lease
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft	foot(feet)
ft ²	square foot(feet)
FTU	Formal Training Unit
GFAFB	Grand Forks Air Force Base
GHG	greenhouse gases
gpcd	gallons per capita per day
gpd	gallons per day
HSWA	Hazardous and Solid Waste Amendments
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
in	inch(es)
INRMP	Integrated Natural Resources Management Plan
kg	kilogram(s)
kV	kilovolt(s)
lb	pound(s)
lb/Y	pound(s) per year
LEED	Leadership in Energy and Environmental Design
LQG	large-quantity generator
LOS	level of service
MBTA	Migratory Bird Treaty Act
mg/m ³	milligram(s) per cubic meter of air
mi	mile(s)
mi ²	square mile(s)
MN	Minnesota
MOB 1	First Main Operating Base
MOU	Memorandum of Understanding
mph	mile(s) per hour
MSA	Metropolitan Statistical Area
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	national airspace
NASA	National Aeronautics and Space Administration
ND	North Dakota
NDAAQS	North Dakota Ambient Air Quality Standards
NDDH	North Dakota Department of Health
NDOT	North Dakota Department of Transportation
NEC	Nodak Electric Cooperative, Inc.
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLR	noise level reduction
NMFS	National Marine Fisheries Service
NO _x	nitrogen oxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration

**Environmental Assessment for an Enhanced Use Lease
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**LIST OF ACRONYMS AND ABBREVIATIONS
(continued)**

NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PA	Programmatic Agreement
pCi/L	picocuries per liter
PIF	Partners in Flight
PM _{2.5}	particulate matter less than or equal to 2.5 micrometers in diameter
PM ₁₀	particulate matter less than or equal to 10 micrometers in diameter
ppb	part(s) per billion by volume
ppm	part(s) per million by volume
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
RP	reference post
RPA	remotely piloted aircraft
SCAQMD	South Coast Air Quality Management District
SDWA	Safe Drinking Water Act
SHPO	State Historic preservation Officer
SHSND	State Historical Society of North Dakota
SIP	State Implementation Plan
SLT	Spirit Lake Tribe
SO ₂	sulfur dioxide
SQG	small-quantity generator
SRST	Standing Rock Sioux Tribe
SSA	sole source aquifer
SWO	Sisseton-Wahpeton Oyate
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
T	ton(s)
TAADT	annual average daily traffic for trucks
TAS	True Air Speed
THPO	Tribal Historic Preservation Office
TMDL	total maximum daily load
TPY	ton(s) per year
TRB	Transportation Research Board
TSCA	Toxic Substances Control Act
UAS	unmanned aerial system(s)
UND	University of North Dakota
US	United States
US-2	United States Highway 2
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USEPA	United States Environmental Policy Act
USFWS	United States Fish and Wildlife Service
v/c	volume-to-capacity
VOC	volatile organic compound

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1.0 INTRODUCTION

This environmental assessment (EA) evaluates the potential environmental impacts of activities associated with the development of a mixed-use business park by Grand Forks County (County) on land that would be leased to the County by Grand Forks Air Force Base (GFAFB) in accordance with the United States (US) Air Force Enhanced Use Lease (EUL) Program under authority of Title 10 US Code (USC) Section 2667. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321, et seq.) by the County in coordination with the Air Force Civil Engineer Center's (AFCEC) NEPA Center and GFAFB.

NEPA requires federal agencies to consider environmental consequences in their decision-making process. The Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA at Title 40 of the Code of Federal Regulations (CFR) Sections 1500-1508 (40 CFR 1500-1508) mandate that all federal agencies use a systematic interdisciplinary approach to environmental planning and the evaluation of actions that might affect the environment. The Air Force Environmental Impact Analysis Process (EIAP) is accomplished through adherence to CEQ regulations and 32 CFR 989. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action.

Development of the proposed mixed-use business park would only commence upon satisfactory completion of this EA and issuance of a Finding of No Significant Impacts (FONSI) and any required Findings of No Practicable Alternative (FONPA) for construction in either wetlands or floodplains. Additionally, if the EA cannot sufficiently analyze the proposed project and alternatives, or if the EA process identifies potentially significant impacts, an Environmental Impact Statement (EIS) would need to be conducted and the project would only proceed upon its satisfactory completion and issuance of a Record of Decision.

1.1 PURPOSE AND NEED

GFAFB proposes to lease approximately 217 acres (ac) to the County for the purpose of developing, constructing and operating a mixed-use business park. The County would develop the business park to support research and development, testing and evaluation, and operations of unmanned aerial systems (UAS)¹, as well as activities centered on the development of sensor technology and data management. The County would work with private developers to create a business park that would offer some of the advantages of proximity to an Air Force base with the flexibility and responsiveness of a private development.

The purpose of the mixed-use business park would be to serve as a focal point for partnerships with other communities, academic institutions and public and private organizations where unmanned vehicles, sensor development, and data management are underway. In 2010, the 69th Reconnaissance Group and its Global Hawk UAS mission were assigned to GFAFB. The Department of Homeland Security Customs and Border Protection (CBP) has UAS operations and the University of North Dakota (UND) has UAS training at GFAFB as well. The need for the action is as an economic generator for the County and the region by creating jobs and expanding the tax base. Developing this business park at GFAFB may promote partnerships that would help reduce costs, improve readiness and help fill the growing need for UAS pilots, maintenance technicians, sensor operators and developers, and data analysts and managers.

1.2 LOCATION

GFAFB is located in Grand Forks County, North Dakota (ND) near the North Dakota-Minnesota state boundary. According to the US Census Bureau (USCB), the County has a total area of 1,440 square miles (mi²) and had a population of 66,861 in 2010 (USCB 2013). The City of Grand Forks is the county

¹ UAS or unmanned aerial system refers to the full system for operating a remotely piloted aircraft (RPA), including the ground-based operating systems and the RPA itself.

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seat of the County. The city incorporates an area of 19.91 mi² and had a 2010 population of 52,838. GFAFB is 15 miles (mi) west of the city of Grand Forks encompassing 5,151 ac in an otherwise rural area. US Highway 2 (US-2), forms the southern edge of GFAFB, separating the base from the city of Emerado, a small community of 414 people, just south of the eastern side of the base. The proposed lease/development area is in the southwest corner of the base along US-2 at an elevation of roughly 900 feet (ft) above mean sea level (msl) (**Figure 1-1**).

1.3 INTERAGENCY/INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) is required under Air Force Instruction (AFI) 32-7060 for the purpose of cooperating with other federal, state, and local agencies and to consider their views on implementing a federal proposal. The Description of Proposed Action and Alternatives (DOPAA) was provided to some federal and state agencies for their input. The draft EA was sent to other relevant federal, state and local agencies for their comment and review. A copy of the letters sent, a list of agencies to which the letters were sent, and any comment letters received are included in **Appendix A**.

GFAFB also corresponded and consulted with the State Historic Preservation Officer (SHPO), any authorized Tribal Historic Preservation Officers (THPOs; described below), and the assigned Advisory Council on Historic Preservation (AChP) representative as needed or required to determine whether there are any areas or property of concern involving the proposed business development site. Section 106 of the National Historic Preservation Act (NHPA) and Air Force Instruction (AFI) 32-7065 requires that GFAFB engage in government to government consultations between the Air Force and federally listed or affiliated tribes if requested and agreed to by the pertinent tribe(s) and that the consultation process be completed prior to fully finalizing the EA. The 319 Air Base Wing (ABW) Commander and the Cultural Resource Manager (CRM) at GFAFB sent letters on 22 October 2013 notifying the tribes and the THPO of the proposed project, the area of potential affect (APE), prior surveys and findings, and inquiring whether the tribes desired to engage in consultations pursuant to the NHPA, Section 106.

Historically, on prior projects sited on GFAFB, the tribes have not requested Section 106 consultations and consistently replied that adverse effects to historic properties and resources would not occur and the consultation process was not necessary; therefore, by 20 November 2013, during which time further follow-up by GAFB occurred (telephone calls and/or emails) since the October letters, the CRM reported that only one tribe, the Cheyenne River Sioux Tribe (CRST), requested Section 106 consultations on the proposed action. The THPO for the CRST expressed concern that past surveys and data had not fully considered whether there were any items or resources of cultural or religious significance to the tribe. The CRST was particularly concerned that appropriate responses should occur in the event any gravesites or human remains were found during pre-construction and actual construction activities. Subsequently the CRST requested the GFAFB visit the CRST for consultation purposes. The 319 ABW Vice Commander, CRM, Installation Support Team Cultural Resources, and AFCEC attended an onsite meeting on 05 December 2013 to open consultations, but due to a lack of obtaining Tribal quorum, were unable to accomplish that task. The 319 ABW Vice Commander followed up after the meeting by sending correspondence to the CRST on 20 December 2013 and invited them to visit the installation to view the APE. On 04 February 2014, the GFAFB sent a proposed Memorandum of Understanding (MOU) to the CRST to outline the purpose and need to engage in a base site visit allowing the CRST an opportunity to present their concerns. To preliminarily discuss the proposed MOU, the 319 ABW Vice Commander, the CRM, and Air Force legal counsel participated in consultations through a teleconference on 19 February 2014 (due to Air Force travel budget constraints), with the CRST THPO and his invitees, the representatives from the Standing Rock Sioux Tribe (SRST) and the Sisseton-Wahpeton Oyate (SWO). The Spirit Lake Tribe (SLT) was also invited by the three named tribes above comprising the Tribal Nations and the SLT agreed to participate. These named tribes are hereafter referred to as the "Tribes". The principal request by the Tribes was to access the APE on GFAFB to perform its own cultural resources survey and discuss inadvertent discoveries during pre-construction and construction activities of project development; thereafter, an MOU was drafted for the Tribes' review. Initial discussions had focused on a Programmatic Agreement (PA) but were later changed to an MOU at the direction of the AChP when the SHPO decided a PA was not necessary and only limited AChP participation would be

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needed at this point. The 319 ABW evaluated the Tribes' review and comments of the draft MOU and the Final MOU was prepared and sent to the Tribes for its final review and signatures. The MOU is found in **Appendix B** to this EA.

Additionally, the draft EA and draft FONSI/FONPA was made available for a 30-day public comment period to solicit the input from several agencies, the public as well as other interested parties. A Notice of Availability (NOA) for the draft EA was published in the *Grand Forks Herald* and the *Grand Forks Air Force Base Leader*. A copy of the NOA along with a matrix of comments received and the MOU is contained in **Appendix B**.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

This EA identifies, describes, and evaluates the potential environmental impacts that are associated with the County developing, constructing, and operating a mixed-use business park on underutilized, non-excess land leased from GFAFB. Two conceptual layouts of the business park are evaluated as alternatives in the EA. The proposed action also includes the launch and recovery of remotely piloted aircraft (RPA) subject to notice to the County and written request to the Air Force for its review and approval and compliance with applicable Federal Aviation Administration (FAA) regulations. This portion of the proposed action would be the same between the two action alternatives. The potential environmental effects of taking no action are also described.

Resources that have a potential to be impacted from the proposed action are considered in detail in this EA in order to provide the Air Force decision-maker with sufficient evidence and analysis pursuant to 40 CFR 1508, EA, and 32 CFR 989, EIAP, on whether to approve a FONSI or prepare an EIS. The resources analyzed in this EA are air quality, water resources, biological resources, cultural resources, hazardous materials and wastes, geology and soils, land use, noise, transportation, utilities, socioeconomics, environmental justice, and occupational health and safety.

The present environmental analysis of the proposed business park development under two conceptual plans and mapping allows for a baseline of environmental impact analysis in this EA that will facilitate and reduce the time for specific design plan reviews and coordination of land uses stemming from the incremental development phases over the life of the entire business park project. If during the course of specific design plan reviews, significant new circumstances or information relevant to environmental concerns are discovered or the scope or proposed siting of any specific project associated with the proposed action changes enough to be outside the coverage of the present EA analysis and findings, then that project would no longer be covered by this EA. An additional environmental impact analysis process must be undertaken which might result in further documentation to include a supplemental EA; however, the new project undergoing an analysis process would not affect the other projects to the extent they remain within the scope of this EA.

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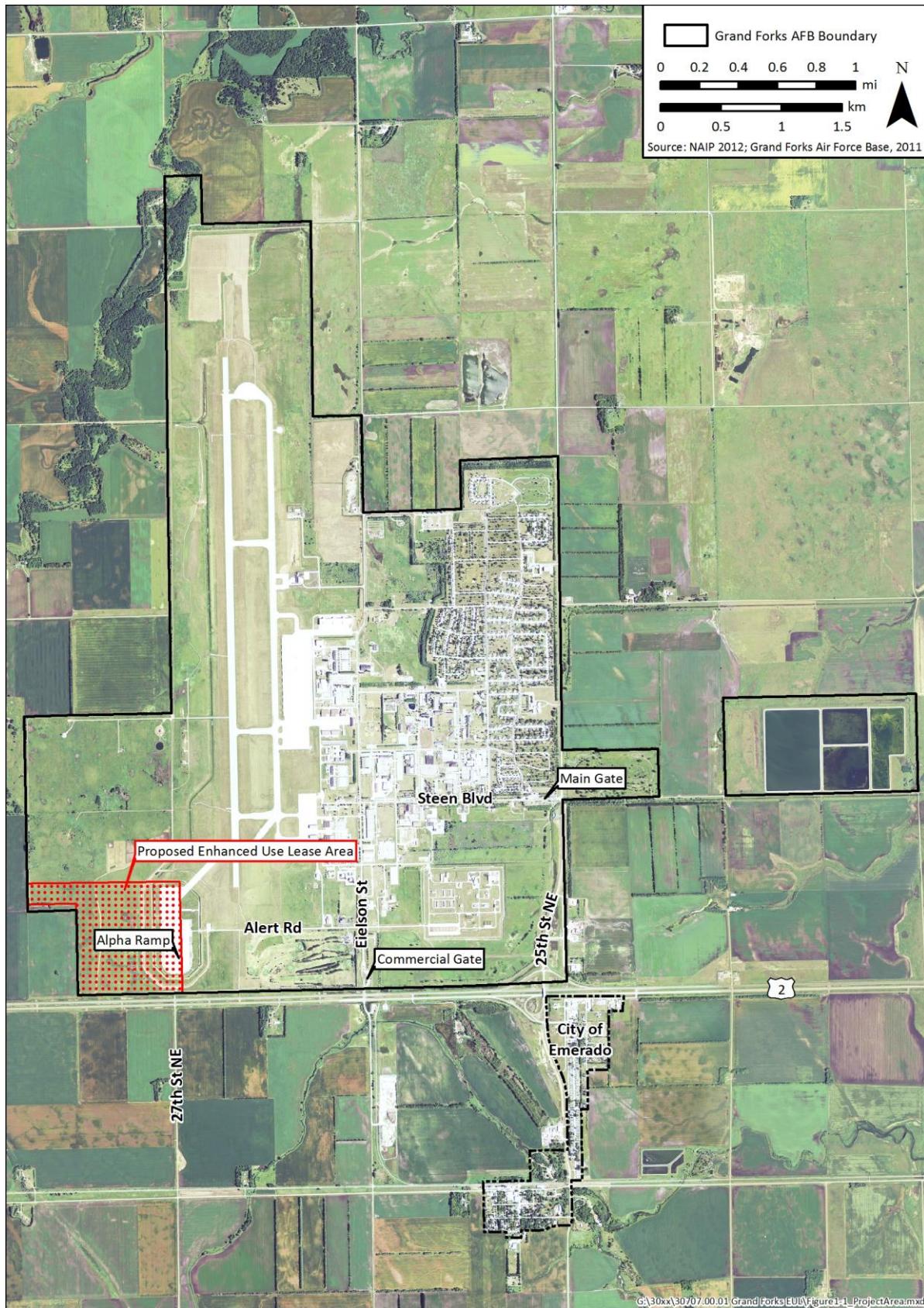


Figure 1-1. Grand Forks Air Force Base, North Dakota.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 ALTERNATIVE SCREENING PROCESS

The County's single proposal submission to the Air Force and GFAFB was for the development, construction, and operation of a mixed-use business park. The County and Air Force considered available and suitable non-excess property on GFAFB for potential development of the business park and determined the parcel described as the preferred alternative would be carried forward in the environmental analysis for this EA.

In selecting possible locations for the business park, the Air Force and County looked for sites that met the following selection standards:

- Contiguous land area greater than 20 ac (largest plot possible and minimal wetlands preferred)
- Areas within the perimeter fence line of the base, for security purposes
- Near periphery of the base for ease of access/security concern (so the County's tenants would not have to enter the development through base security)
- Direct access or proximity to the flight line
- Unused (little or no demolition needed) with no identified future mission need

During the screening process, the Air Force and County looked at several locations around the base, but ultimately identified only one acceptable parcel to evaluate further. The parcels that were considered, but rejected before additional evaluation are discussed in **Section 2.3.1**.

2.2 PROPOSED ACTION AND ALTERNATIVES

The proposed action involves the development, construction, and operation of a mixed-use business park on land leased by Grand Forks County from the Air Force at GFAFB. The County intends the development to focus on UAS activities. The County would work with private developers to create a mixed-use business park that would support research and development, testing and evaluation, training and operations of UAS, as well as activities centered on the development of sensor technology and data management.

In addition, the County would, subject to any required Air Force approvals, conditions, or restrictions, reconnect the existing taxiway from the former aviation parking ramp to the operational runway. Individual tenants approved by the County would need to specifically notify the County and request in writing for Air Force consideration and approval to use the taxiway and runway to launch and recover RPA. This EA evaluates the launch and recovery of RPA from GFAFB subject to necessary Air Force evaluations, approvals, conditions, or restrictions, and FAA regulations. If granted all necessary Air Force permissions, the requesting business park tenant would be allowed to launch RPA sorties that consist of launch, climbing to an operational altitude, flying at altitude, and returning to base based on the scope of the basic analysis conducted in this EA. No live munitions would be approved to be carried by the RPA. Further, if approval or permission is granted by the Air Force but launch and recovery of RPA sorties differs from the analysis conducted in this EA then additional Air Force environmental impact analysis process (EIAP) will be necessary prior to conducting any RPA activity.

Although only one acceptable site location for the proposed development was identified, this EA evaluates two conceptual layouts for the business park. Details of the County's proposed development plan and proposed flight operations are described under Alternative 1 in **Section 2.3.3**. Following the wetland delineation within the project area, a second conceptual layout for the business park was created in an effort to minimize, to the maximum extent practicable, the potential impacts on wetlands in the project area. This second layout is described as Alternative 2 in **Section 2.3.4**. Most components of Alternative 1 are the same under Alternative 2; only those features or actions that differ between the two alternatives are described and analyzed under Alternative 2. If during the course of specific design plan reviews, significant new circumstances arise relevant to environmental concerns or the scope of the proposed siting of any specific project associated with the proposed action change enough to be outside

the coverage of the present EA analysis and findings, then that specific project would no longer be covered by this EA. An additional environmental impact analysis process must be undertaken which might result in the need for further documentation, such as a supplemental EA; however, the new project undergoing analysis would not affect the other projects within the business park to the extent they remain within the scope of this EA.

2.3 ALTERNATIVES

2.3.1 *Alternatives Considered but Eliminated from Further Analysis*

When the County approached GFAFB with the proposal for the mixed-use business park, the County and Air Force considered available and suitable non-excess property on GFAFB to identify potential sites for the development.

Six parcels were initially identified and compared to the selection standards listed above:

- Sunflake Housing Area—approximately 80 ac directly adjacent to the main entrance of the base on B-3. This parcel was eliminated from consideration due to its greater distance from the airfield and because it is not within the confines of the base security fence.
- Administrative parcel—approximately 18 ac located on Steen Blvd. Although slightly less than 20 ac, this parcel was initially evaluated during the site selection process. The parcel was eliminated from consideration because there are plans to use it for the location of new base administrative functions, it is not located in proximity to the flight line, and it has a relatively small usable land area.
- Flight Line North—approximately 26 ac located north of existing three-bay hangar. This parcel was eliminated from consideration because its interior location would prove difficult to maintain security of the base. It also has been identified as the preferred location for additional Mission Hangar Space and has a relatively large amount of wetlands.
- Munitions Storage Area Parcel—28 ac located east of the commercial gate. This parcel was eliminated from consideration due to its greater distance from the flight line and because the shape of parcel would make it difficult to efficiently develop usable space.
- Flight Line South—approximately 30 ac located on south end of Bravo-Ramp. This parcel was eliminated from consideration due to significant wetlands and the fact that it has been identified as a location for future Mission Facility Expansion.

The sixth parcel considered, in the southwest corner of the base, was determined to be the best and only feasible choice for the proposed development. It is presented in more detail under **Section 2.3.3, Alternative 1—Initial Layout**.

2.3.2 *No Action Alternative*

CEQ regulations require evaluation of the no action alternative under NEPA. The no action alternative serves as a baseline for evaluating the impacts of the proposed action and alternatives.

Under the no action alternative, the proposed development activity would not occur and the proposed lease parcel would remain as underutilized non-excess property at the base.

2.3.3 *Alternative 1—Initial Layout*

Alternative 1 is the development, construction and operation a mixed-use business park on approximately 217 ac of land in the southwest corner of GFAFB. This alternative also includes the potential for RPA flight operations, if approved, consisting of up to 100 sorties per month taking off from the GFAFB

runway. The following discussion presents different types of development that would be located in the lease area, the construction and demolition activities, infrastructure requirements, potential flight operations, development management, and schedule.

2.3.3.1 Development Types

Alternative 1 would include three primary development types within the business park—mixed-use aviation, mixed-use office, and technology/data center facilities. Each of these types of development is discussed below.

- Mixed-Use Aviation—the mixed-use aviation buildings would include two hangar spaces from about 15,000 square feet (ft^2) up to approximately 30,000 ft^2 each, separated by a two-story core that would include between 15,000 and 30,000 ft^2 of office or shop space. This type of development would allow for aviation users, particularly maintenance and training operations, to have both classroom/laboratory opportunities together with necessary hangar space for “hands-on” capabilities. In lieu of hangar spaces, the buildings could have high-bay space or additional office space that would be used in the place of hangar space.

In the layout for Alternative 1, the County expects to construct four of these mixed-use aviation parcels on the west side of the Alpha Ramp, which is part of the proposed lease area. Each parcel would be roughly 4 ac with approximately 45,000 ft^2 of building footprint, 48,555 ft^2 of green space and 112 parking places. The western half, or roughly 3,286 ft, of the existing 20-ft high security wall that encircles the Alpha Ramp may need to be demolished before beginning construction on any of these parcels; however, some sections of the wall may remain to help provide security for the maneuvering area of the Alpha Ramp.

- Mixed-Use Office—the mixed-use office facilities would have a primary focus on office uses, augmented by additional spaces that could support training and some light industrial uses as necessary. These buildings would range between 20,000 to 70,000 ft^2 .

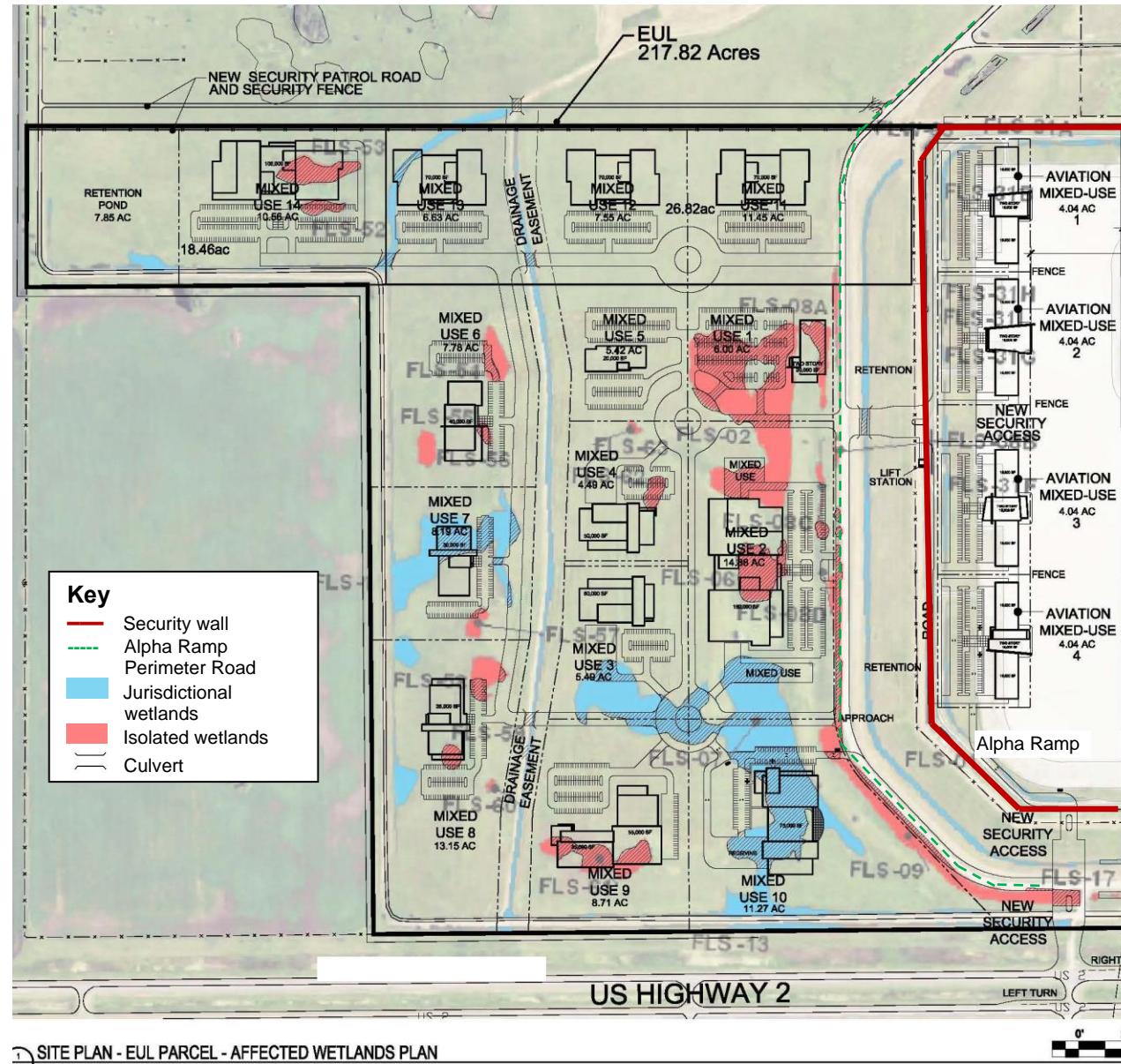
The County proposes to develop the rest of the lease area (not on the existing Alpha Ramp) into roughly 14 mixed-use office or technology/data center parcels with facilities of various sizes and layouts depending on the needs of the tenant. Each parcel would be laid out to include the appropriate building size, an average of about 50 percent green space, and sufficient parking for the future occupants of the buildings.

- Technology/Data Center Facilities—these facilities would primarily house data processing and storage activities. Uses could include traditional data center uses, or could include a Distributed Ground Station (DGS), for either secure or non-secure data. Facilities would range from as small as 40,000 ft^2 to as large as 150,000 ft^2 . These facilities would be generally the same as the mixed-use office facilities except they would likely require a more robust cooling unit for computer rooms and additional communications capacity.

A conceptual layout of the proposed development is shown on **Figure 2-1**. The mix of the building size or layout may vary from the figure, depending on the tenants' needs and detailed design considerations; however, this layout is being used for the analysis of potential impacts of Alternative 1. The County expects to complete the development in phases going from south to north, extending the infrastructure as buildings are added to the north. The layout and individual building plans would be submitted to the Air Force for review before construction of each phase. At that time, GFAFB would determine if the plans conform to the proposed action covered in this EA. If not, a supplemental EA or EIS would need to be conducted before proceeding with the proposed project.

As part of the GFAFB's runway rebuilding project in 2006, roughly 230 ft of the Alpha Ramp taxiway that connected to the base's main runway was removed. In order to facilitate the potential future use of the taxiway to move RPA from the development to the runway, the County would reconstruct that portion of the 100-ft-wide taxiway.

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Upon completion, the development of Alternative 1 would consist of:

- Up to 1.2 million ft² of building footprint
- Parking lots comprising approximately 1.2 million ft² (for approximately 2,500 parking spaces),
- Roads covering about 680,000 ft² including a new section of perimeter road
- Taxiway repair of roughly 23,400 ft²

During the construction process, the development may also require some demolition, such as:

- Approximately 3,286 ft (or half) of the 20-ft-high security wall
- Roughly 2,900 ft of the Alpha Ramp Perimeter Road on the outside of the security wall that would be torn down (western half)

Parts of the security wall may be used in place; however, the County wants the option to remove it if needed in their final plans. Likewise, the Alpha Ramp Perimeter Road may be incorporated into the new paved road rather than removed.

Construction activities and materials would promote as many Leadership in Energy and Environmental Design (LEED) points as possible to meet the requirements for LEED Silver certification. The proposed development would also incorporate pollution prevention procedures (e.g., vegetating open areas to reduce sediment transport in stormwater runoff), and energy and water conservation initiatives into all facilities and activities where practicable or as required by local or state regulations or guidelines. All construction and demolition debris would be recycled for reuse as much as possible, or would be gathered, sorted, transported and disposed off-base pursuant to applicable federal, state and local regulations or ordinances.

2.3.3.2 Infrastructure Requirements

Air Force policy requires that the lease-holder obtain its utilities from private service contracts whenever possible. If a local utility provider is not willing or able to provide service to the lease development, the base can offer a tie-in to its service distribution system. As of March 2013, Alternative 1 would receive electricity, natural gas, and water from the local service providers; however, sanitary sewer services would be provided by GFAFB (Giltner 2013). Alternative 1 would include construction of the utility tie-ins, most of which would be provided by main lines along US-2. The different utility line(s) needed for connection to the various providers' systems is shown on **Figure 2-2**. The approximate lengths of the tie-ins are as follows:

- Water line—5,300 ft
- Sewer line—6,500 ft
- Electrical and back up electrical lines—6,300 ft to the off-base substation and 5,500 ft to the on-base substation
- Natural gas line—10,000 ft
- Secure communications—4,000 ft
- Unsecure communications—10,000 ft

The utility lines throughout the development would be put in place beneath roadways to the maximum extent practicable. Alternative 1 would also require the construction of a security access gate from US-2 at the southeast corner of the proposed lease area. Currently, a median break and gate exist at the south end of the Alpha Ramp, which aligns with the intersection of US-2 and 27th Street NE. The North Dakota Department of Transportation (NDDOT) has plans to add turn lanes at the existing median break and has already secured funding for the 2014 project (NDDOT 2013). The roadway into and out of the development would be paved. Internal roadways would be a mix of two-, three-, and four-lane paved roadways. The perimeter road on the base side of the new fence would be gravel.

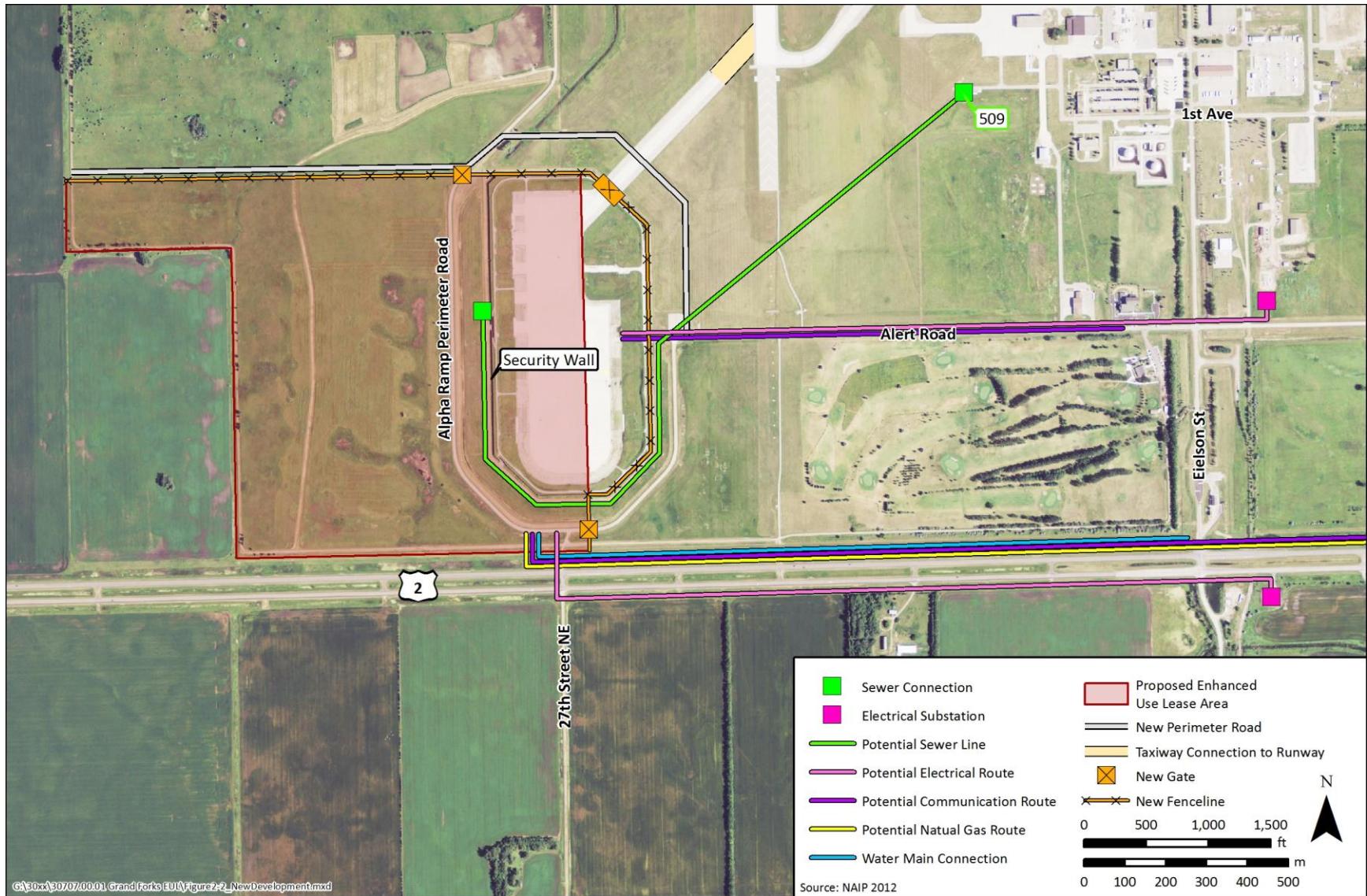


Figure 2-2. Project elements beyond the Enhanced Use Lease area.

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Roughly 3,700 ft of new security fencing would be installed along the north and east edges of the development so that the entire development would be segregated from the base proper. A new perimeter road would be constructed on the base side of the fence to replace the perimeter roads that fall within the lease parcel. The aviation mixed-use buildings would serve as a security entry point to the aircraft apron of the Alpha Ramp. Two entry points between the development and the rest of the base, one along the northern fenceline and the other at the entrance from US-2 to the right through the new fenceline would be provided in the perimeter fencing for Air Force access to the lease parcel as needed. A controlled access gate at the Alpha taxiway would also be installed if airfield access is granted by the Air Force. Improvements to the existing east Alpha Ramp entry gate on Alert Avenue would also be made. In addition, the existing crash gate at the south entrance would be moved east to a secondary location.

Alternative 1 is ultimately anticipated to have 800,000 to 1,200,000 ft² of mixed-use facilities including light industrial uses, hangars, classroom/training facilities, administrative office uses, and data centers in a campus style development. There is no anticipated residential, recreational, or heavy industrial component to the proposed development. The ultimate population of the development is estimated to be approximately 2,500 to 3,000 workers at build-out.

To accommodate these users, the following table (**Table 2-1**) summarizes the estimated water and wastewater requirements.

Table 2-1. Water and wastewater system demands at build-out

System	Per Capita Demand	Average Daily Demand	Peak Daily Demand
Water	25 gpcd	75,000 gpd	150,000 gpd
Wastewater	20 gpcd	60,000 gpd	120,000 gpd

gpcd = gallons per capita per day; gpd = gallons per day

Water would be provided for the development by Grand Forks Traill Water Users, Inc. A water main exists in the easement for US-2 and would be connected to a series of looped 8-inch (in) and 10-in mains generally following the proposed roadways. Fire hydrants would be spaced 300 ft apart in accordance with UFC 3-230-10A. Wastewater collection and treatment would be provided by the base. Currently, there is no wastewater collection system at the Alpha Ramp or other parts of the proposed EUL area. Approximately 6,500 ft of force main and a lift station would be needed to connect the gravity mains from the development to the base's wastewater system at the lift station at Building 509.

Electricity would be provided from Nodak Electric Cooperative, Inc. (NEC). The development would be served by an underground distribution loop using a series of pad mount outdoor distribution switches connected in a feed-through configuration. The circuits would be installed either in concrete-encased duct banks or by direct bury. The electrical system would be constructed in accordance with accepted industry standards for underground electrical distribution. Transformers would be placed adjacent to each structure in accordance with required anti-terrorism/force protection (ATFP) stand-off distances. Each building would have individual meters.

The proposed development is expected to be primarily for non-government operations; therefore, it would not be connected into GFAFB's secure telecommunications and data infrastructure; however, connection to base emergency medical and fire services is expected. The communications infrastructure would be constructed such that it meets all Department of Defense (DOD) requirements in the event that some operations within the area convert to government operations at a later time. Telecommunications service would be provided from a private provider through a franchise or service agreement. The provider would run the necessary media to and within the on-site infrastructure duct banks.

Two well-defined drainage ditches run from south to north across the development parcel. Surface drainage flows north to the Turtle River via these drainage ditches that transect the project site. New storm sewers would be installed to collect run-off from roadways and paved areas. In accordance with Section 438 of the 2009 Energy Independence and Security Act (EISA), natural hydrology would be

maintained or restored to the maximum extent technically feasible. Site design would incorporate stormwater retention and reuse technologies to minimize changes to the off-site drainage. In addition, Grand Forks County Zoning Resolution Storm Water Management requires the site design to accommodate the 100-year/24-hour storm, which for this site is approximately 5 ac-ft of storage. No changes are anticipated to the existing surface drainage from the Alpha Ramp area.

2.3.3.3 Development Management

To implement this development concept, Grand Forks County would enter into a 50-year land lease with the Air Force. The lease would establish a plan for orderly and efficient development of the parcels and would provide right of entry, enable environmental characterization and compliance, and memorialize the development concept and plan. It would also describe utility corridors and general access points, and provide for the intent to cooperatively work together with the Air Force to solve contingencies for the mutual benefit of the development.

The County would work with the prospective tenants through typical design phases consisting of pre-design, schematic design, design development and construction documents. The plans would reflect Air Force design and use guidelines and the GFAFB Architectural Compatibility Plan. Throughout these phases the County would submit supporting documentation to GFAFB for review. The County would also comply with applicable building codes adopted by Grand Forks County Planning and Zoning. The County's contractor(s) for the development would be required to schedule and submit for required inspections and approval procedures for construction materials and design requirements, including engineering design submittals.

2.3.3.4 Flight Operations

The County currently does not have any tenants with Air Force approval to access and use any constructed and/or existing taxiway or runway on GFAFB to conduct RPA flight operations; however, the County would like to have a baseline level of RPA flight operations evaluated in this EA so that a prospective tenant could request the appropriate review and approvals from the Air Force for such operations and which might also minimize the time needed to conduct the Air Force's environmental impact analysis process when a written request is actually submitted. In addition to Air Force approval to use the runway at GFAFB, the potential flight operations covered under this EA would need to follow FAA regulations regarding UAS flights.

For purposes of accomplishing a reasonable baseline environmental analysis of the flight activities in this EA, the County projects that tenants seeking Air Force permission would need to launch up to 100 RPA flights per month, or an average of three to four per day, from GFAFB. RPA flight operations would entail launching an RPA, having it climb to an operational altitude, flying at altitude, and returning to base. The tenant, if approved by the Air Force to perform flight operations from GFAFB, would need to file a flight plan with airfield operations to schedule takeoffs and landings and ensure that there would be no conflicts in use of the airspace around GFAFB. RPA flight operations could occur at any time of day on any day of the week (24/7).

Specific tenants have not been identified; therefore, the specific UAS that might be tested, trained on, or used by tenants of the development are not known; however, there are two main types of RPAs that are representative of the UAS that may be operated at the development: the Global Hawk (RQ-4) and the Predator (MQ-1). These systems are already located at GFAFB for training and operating missions. Some characteristics of both the Global Hawk and Predator RPAs are shown on **Figure 2-3**.

2.3.3.5 Schedule

The construction schedule for each proposed building is roughly 12 to 18 months and is dependent on the timing of the design schedule relative to the weather cycle of the region. Infrastructure construction could range from 8 to 12 months depending upon the timing of its design schedule relative to the weather cycle of the area.

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The County anticipates starting the development at the southern edge along US-2 and working northward as tenants are acquired; however, this is subject to change if an early tenant wants to lease one of the aviation mixed-use parcels on the former Alpha Ramp. For purposes of the impact analyses, it is assumed that one-third of the infrastructure and one-sixth of the buildings (roughly three buildings) would be constructed every 2 years—infrastructure would be completed in approximately 6 years, whereas the buildings and the rest of the development in 10 to 20 years. The potential demolition of the Alpha Ramp wall and the connection of the taxiway to the runway would occur in years two and three, respectively.



Photo courtesy of Northrop Grumman/NASA 2012

GLOBAL HAWK (RQ-4)

Manufacturer: Northrop Grumman
Wingspan: 130.9 ft
Length: 47.6 ft
Height: 15.4 ft
Speed: 310 knots True Air Speed (TAS)
Maximum altitude: 60,000 ft above msl
Maximum payload: 3,000 pounds (lb)

PREDATOR (MQ-1)

Manufacturer: General Atomics
Wingspan: 55 ft
Length: 27 ft
Height: 6.9 ft
Horsepower: 101 horsepower (hp; 115 hp max.)
Speed: 84 miles per hour (mph; 70 knots), up to 135 mph
Altitude: up to 25,000 ft above msl,
generally 10,000-15,000 ft
Maximum payload: 450 lb



Photo courtesy of United States Air Force (2006a)

Figure 2-3. Global Hawk and Predator remotely piloted aircraft.

2.3.4 Alternative 2—Revised Layout

Alternative 2 would be developed on the same 217 ac site as Alternative 1. The only difference between Alternative 1 and Alternative 2 is the proposed layout of the development. The layout on **Figure 2-1** is an example of the development initially proposed by the County. It was used to provide estimated numbers for the analysis of impacts. The layout for Alternative 2 is shown on **Figure 2-4**. This layout was developed following the Jurisdictional Determination of wetlands by the US Army Corps of Engineers (USACE) in order to minimize, to the maximum extent practicable, the impact on wetlands, both jurisdictional and non-jurisdictional, in the project area.

The revised layout still proposes to have approximately 1.2 million ft² of building footprint, but less overall paved area with parking and roads totaling about 1.6 million ft² instead of 1.88 million ft² with the original layout. More importantly, the buildings and roads have been moved so that the four largest wetland areas would remain undisturbed (see **Section 4.2.3**). The revised layout would not change the types of development that would be located in the lease area, the basic construction and demolition activities, infrastructure requirements, potential flight operations, development management, or schedule. A comparison of the two alternatives is provided in **Table 2-2**.

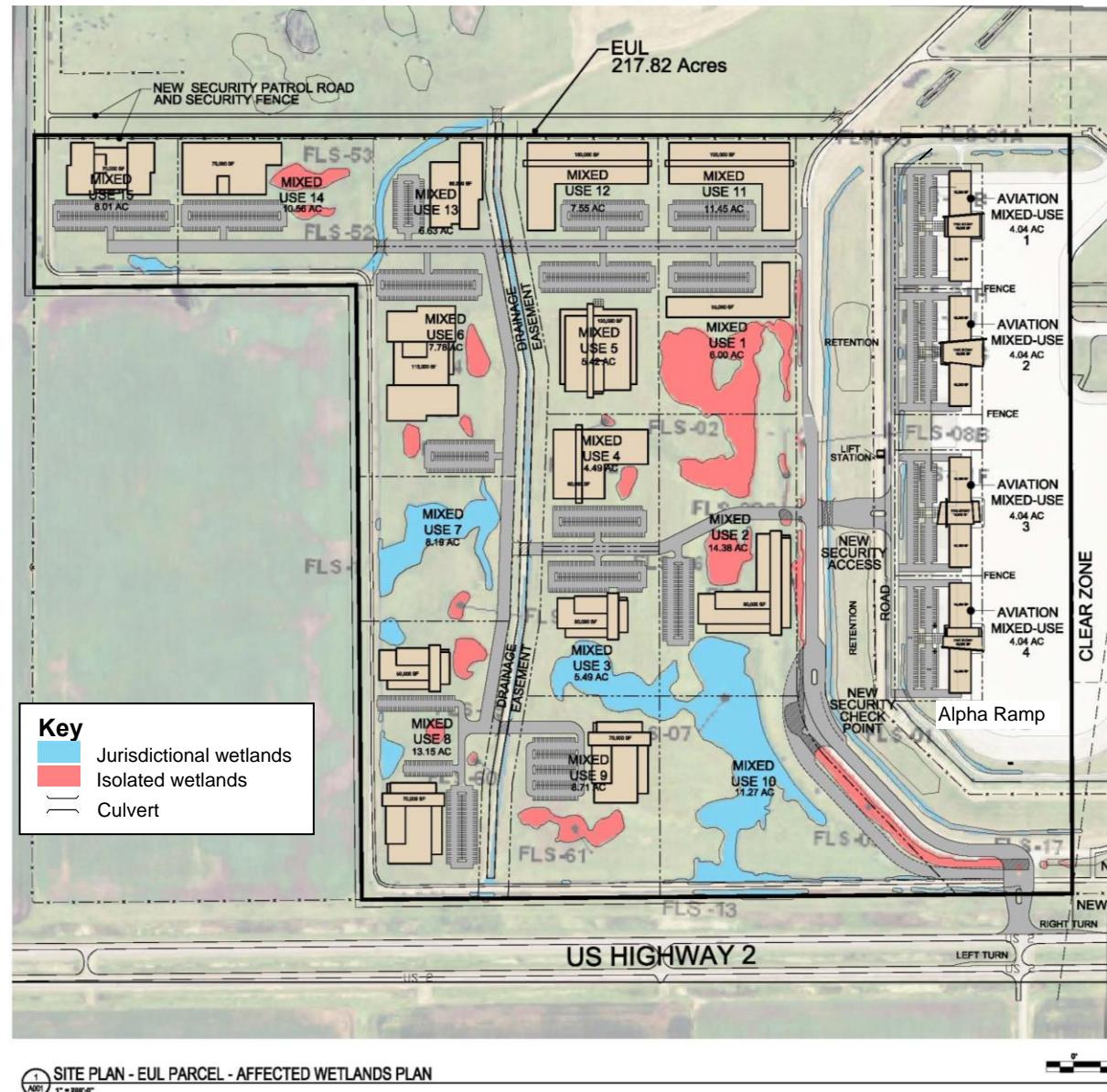


Figure 2-4. Proposed development plan for Alternative 2 on the Enhanced Use Lease parcel

Table 2-2. Comparison of features of the alternatives

Feature	Alternative 1	Alternative 2
EUL Size	217 ac	217 ac
Building footprint	1.2 million ft ²	1.2 million ft ²
Paved roads and parking areas	1.88 million ft ²	1.60 million ft ²
Number of building lots	18	18
Security fencing	3,700 ft	3,700 ft
Gates	2 new access gates, 1 improved access gate, 1 taxiway gate	2 new access gates, 1 improved access gate, 1 taxiway gate
Acres of jurisdictional wetlands permanently impacted	4.674 ac (203,599 ft ²)	0.314 ac (13,678 ft ²)
Acres of non-jurisdictional wetlands permanently impacted	5.556 ac (242,019 ft ²)	0.496 ac (21,606 ft ²)
Acres of jurisdictional wetlands temporarily impacted	1.386 (60,374 ft ²)	0.738 (32,147 ft ²)
Acres of non-jurisdictional wetlands temporarily impacted	2.807 ac (122,272 ft ²)	0.809 ac (39,596 ft ²)

EUL=Enhanced use lease, ac=acre, ft²=square feet; ft = feet

2.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The environmental consequences for each resource area and each alternative are summarized below in **Table 2-3**.

The term “Mitigation” is specifically defined at 40 CFR 1508.20 as follows:

- a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- e) Compensating for the impact by replacing or providing substitute resources or environments.

The features or activities that have been incorporated into the proposed action to mitigate any potentially significant impacts to less than significant are listed in **Table 2-4**. Except where noted, all of the mitigation measures would be incorporated into either alternative. Additional details of the mitigation measures incorporated into the project are listed in the project-specific Mitigation Plan in **Appendix C**. This plan would be modified as needed to account for minor changes in the final design plans when they are presented to the Air Force for review.

Table 2-3. Summary of environmental consequences

Resource Area	Alternative 1—Initial Layout	Alternative 2—Revised Layout	No Action Alternative
Air Quality	Construction: Short-term construction related emissions would be negligible and not significant. Operation: Minor long-term increase in emissions would not be significant Flight Operations: Minor long-term increase in emissions but would not be significant	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Water Resources	Construction: Minor impact on water quality; adverse, but not significant, impact on wetlands; no impact on stormwater management Operation: None Flight Operations: None	Construction: Similar effects on water quality and stormwater management as with Alternative 1; adverse, but substantially reduced impacts on wetlands than Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Biological Resources	Construction: Loss of vegetation and habitat would be adverse, but not significant. No T&E species present. Operation: None Flight Operations: Potential BASH concerns would not be significant.	Construction: Same as Alternative 1, but would reduce/minimize impact to wetland or grassland habitats Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Cultural Resources	Construction: Little likelihood Operation: None Flight Operations: None	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Hazardous Materials and Waste	Construction: Slight short-term increase in use and disposal of hazardous materials and waste but would not be significant Operation: Minor long-term increase in use and disposal of hazardous materials and waste but would not be significant Flight Operations: Same as operation	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Geology and Soils	Construction: Minor short-term soil disturbance would not be significant Operation: None Flight Operations: None	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Land Use	Construction: Permanent change in land use, compatible with existing land use plans and would not be significant Operation: None Flight Operations: None	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None

Table 2-3 (continued). Summary of environmental consequences

Resource Area	Alternative 1—Initial Layout	Alternative 2—Revised Layout	No Action Alternative
Noise	Construction: Short term increase in noise levels would not be significant Operation: None Flight Operations: Minor long-term changes in predicted noise contours would not be significant	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Transportation	Construction: Temporary, short-term increase in traffic would not be significant Operation: Long-term increased traffic is within capacity of existing roads and not significant. Flight Operations: RPA flights in non-restricted airspace would not cause significant effects.	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Utilities	Construction: None Operation: Long-term increase in utilities usage is within system capacity and would not be significant Flight Operations: None	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Socioeconomic Factors	Construction: Beneficial through creation of jobs Operation: Beneficial for jobs, tax base. Phased construction would make adverse effects to area schools and housing less than significant Flight Operations: None	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Environmental Justice	Construction: None Operation: None Flight Operations: None	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None
Occupational Health and Safety	Construction: None Operation: None Flight Operations: Air Force and FAA approval process results in less than significant effects	Construction: Same as Alternative 1 Operation: Same as Alternative 1 Flight Operations: Same as Alternative 1	Construction: None Operation: None Flight Operations: None

T&E = threatened and endangered; BASH = Bird Aircraft Strike Hazard; RPA = remotely piloted aircraft; FAA = Federal Aviation Administration

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Table 2-4. Summary of project features that mitigate environmental consequences

Potential Impact	Mitigation Measures by Grand Forks County
Water Resources	
<ul style="list-style-type: none"> Avoid degradation of water quality from project construction activities 	<ul style="list-style-type: none"> Obtain coverage under ND's NPDES General Permit for Stormwater Discharge Associated with Construction Activities Prepare and follow a site-specific Storm Water Pollution Prevention Plan
<ul style="list-style-type: none"> Avoid or minimize disturbance or loss of wetlands in project area 	<ul style="list-style-type: none"> Reduce and relocate building footprints within project area to avoid as many ac of wetlands as practicable During construction, flag/stake wetland boundaries to keep workers from disturbing wetlands Mitigate for wetland loss by enhancing an existing wetland or wetlands within the project boundaries. Obtain a CWA Section 404 permit (with cooperation from GFAFB) from the USACE. Comply with mitigation measures required by the USACE in their CWA Section 404 permit
<ul style="list-style-type: none"> Comply with stormwater management requirements under Section 438 of the EISA 	<ul style="list-style-type: none"> Use low-impact development techniques to maintain the pre-construction hydrology
<ul style="list-style-type: none"> Comply with North Dakota Department of Health Construction and Environmental Disturbance Requirements 	<ul style="list-style-type: none"> Prevent erosion of exposed soil surfaces and trapping sediments being transported. Control stream bank and stream bed disturbances to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. Coordinate use of pesticides or herbicides with those accepted for use by GFAFB in the installation. Fill placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds. Debris and solid waste will be properly removed and impacted areas restored as nearly as possible to the original condition.
Biological Resources	
<ul style="list-style-type: none"> Potential impact on migratory birds that lay over or nest in project area 	<ul style="list-style-type: none"> If practicable, time construction in the grassland area to avoid the primary nesting season April 15 to July 15 (Migratory Bird Treaty Act and the INRMP) To avoid construction delays, conduct preconstruction surveys to look for and avoid any nesting grassland birds or bald eagles (in trees). If nests are located in the area, consult with USFWS for mitigation Maintain native prairie/grassland in areas of the lease that do not need to be disturbed until later phases of construction Reseed disturbed grassland areas as soon as possible with native grassland seed mixes

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Table 2-4 (continued). Summary of project features that mitigate environmental consequences

Potential Impact	Mitigation Measures by Grand Forks County
<ul style="list-style-type: none"> Potential impact on populations of lady's slipper orchids documented in the northwest corner of the project area 	<ul style="list-style-type: none"> Before preparing the plans for development of the northwestern-most parcel of the project area, conduct surveys for white and yellow lady's slipper orchids and avoid disturbing the existing population to the maximum extent practicable Herbicide application will not be conducted in areas where white or yellow lady's slipper occurs
Cultural Resources	
<ul style="list-style-type: none"> If cultural resources are discovered during construction 	<ul style="list-style-type: none"> Halt construction and immediately notify the GFAFB EUL Project Coordinator and/or Cultural Resources Manager of the discovery in order to accurately identify and assess the discovery and to generate appropriate responses based on applicable federal laws, regulations and policies Follow stipulations of the MOU between affected Tribes and the Air Force, provided the MOU is applicable to the assessed cultural resources discovery
Hazardous Materials and Waste	
<ul style="list-style-type: none"> Use of hazardous materials and generation of hazardous wastes at the business park by the County or tenants 	<ul style="list-style-type: none"> Prepare a Hazardous Waste Management Plan that would stipulate the processes and procedures for managing, transporting, handling, storing, treating and disposing of hazardous materials and/or hazardous waste and substances generated within the business park boundaries
<ul style="list-style-type: none"> Grand Forks County has predicted average indoor radon screening level above the USEPA radon guideline of 4 pCi/L. 	<ul style="list-style-type: none"> Buildings to be designed to reduce radon penetration to the interiors.
Transportation	
<ul style="list-style-type: none"> Potential change in traffic patterns 	<ul style="list-style-type: none"> Ensure that NDDOT adds turn lanes to US-2 at the entrance to the development to prevent potential traffic slowdowns on the highway
Utilities	
<ul style="list-style-type: none"> Impacts due to increased utility usage 	<ul style="list-style-type: none"> Design and construct buildings to meet the requirements for LEED Silver certification and incorporate as many energy and water conservation initiatives as practicable

ND = North Dakota; NPDES = National Pollutant Discharge Elimination System; CWA = Clean Water Act; GFAFB = Grand Forks Air Force Base; USACE = United States Army Corps of Engineers; EISA = Energy Independence and Security Act; INRMP = Integrated Natural Resources Management Plan; USFWS = United States Fish and Wildlife Service; EUL = Enhanced Use Lease; MOU = Memorandum of Understanding; USEPA = United States Environmental Protection Agency, pCi/L = picoCuries per liter; NDDOT = North Dakota Department of Transportation; LEED = Leadership in Energy and Environmental Design

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3.0 AFFECTED ENVIRONMENT

3.1 AIR QUALITY

3.1.1 *Definition of the Resource*

Air quality is determined by the type and concentration of pollutants in the atmosphere, the size and topography of the air basin, and local and regional meteorological influences. The significance of local pollutant concentrations is determined by comparing them to national and/or state ambient air quality standards. Under authority of the Clean Air Act (CAA), the US Environmental Protection Agency (USEPA) has established nationwide air quality standards, more commonly known as the National Ambient Air Quality Standards (NAAQS) (**Table 3-1**). These standards represent maximum allowable atmospheric concentrations for seven "criteria" pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter less than or equal to 10 micrometers in diameter (PM₁₀), particulate matter less than or equal to 2.5 micrometers in diameter (PM_{2.5}), ozone, and lead. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility; and damage to animals, crops, vegetation, and buildings. NAAQS are defined in terms of concentration determined over time. Short-term standards (1-hour, 8-hour, or 24-hour periods) have been established for acute health effects and may be exceeded only once per year for an area to be considered "in attainment". Long-term standards for chronic health effects are never to be exceeded (USEPA 2009). Based on measured ambient air criteria pollutants, the USEPA designates areas of the US as having air quality equal to or better than the NAAQS (attainment) or worse than the NAAQS (non-attainment).

States may establish their own standards as long as they are at least as stringent as the national requirements. North Dakota has adopted a more stringent set of standards, termed the North Dakota Ambient Air Quality Standards (NDAAQS) (also listed in **Table 3-1**). A State Implementation Plan (SIP) is a detailed description of the program that the State proposes to use to enforce the CAA regulations. The CAA requires USEPA to review and approve each SIP.

Section 176(c) of the CAA is known as the General Conformity Rule and is codified as 40 CFR 51, Subpart W. Under the General Conformity Rule, no federal agency can approve any activity that does not conform to an applicable SIP. Specific conformity criteria are listed in 40 CFR 51.858. The General Conformity Rule only applies in areas that are in non-attainment or maintenance (40 CFR 51.853 [k]).

Title V of the CAA Amendments of 1990 requires states to issue Field Operating Permits for major stationary sources of air emissions. A major stationary source would include a military base that emits more than 100 tons per year (TPY) of any one criteria air pollutant, 10 TPY of a hazardous air pollutant, or 25 TPY of any combination of hazardous air pollutants. Emissions below these quantities are considered "*de minimus*". The Prevention of Significant Deterioration requirements of the CAA affect construction of new major stationary emission sources in areas that attain the NAAQS and serves as a pre-construction permitting system.

Greenhouse gases (GHG) are gases that trap heat in the atmosphere. These emissions occur from natural processes as well as human activities. The accumulation of GHG in the atmosphere regulates, in part, the earth's temperature. The Intergovernmental Panel on Climate Change, in its Fourth Assessment Report issued in 2007, stated that warming of the earth's climate system is unequivocal, and that most of the observed increase in globally averaged temperatures since the mid-20th Century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations (IPCC 2007). The most common GHG emitted from natural processes and human activities include carbon dioxide, methane, and nitrous oxide.

On a national scale, federal agencies are addressing emissions of GHG by reductions mandated in federal laws and executive orders (EOs). Most recently, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*; and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* were enacted to address GHG in detail, including GHG emissions inventory,

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reduction, and reporting. Several states have promulgated laws as a means to reduce statewide levels of GHG emissions. The North Dakota Department of Health (NDDH) Environmental Health Section issued the Greenhouse Gas Reporting Rule in 2010, which requires owners/operators to report GHG emissions for facilities that emit 25,000 metric tons or more annually of GHGs.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	North Dakota Standards
	Averaging Time	Level	Level	
Carbon Monoxide	8-hour ⁽¹⁾	9 ppm (10 mg/m ³)	none	Same as federal
	1-hour ⁽¹⁾	35 ppm (40 mg/m ³)	none	Same as federal
Lead (in total suspended particles)	Rolling 3-month average ⁽¹⁾	0.15 µg/m ³	Same as primary	Same as federal
Nitrogen Dioxide	Annual ⁽³⁾	53 ppb (100 µg/m ³)	Same as primary	Same as federal
	1-hour ⁽²⁾	100 ppb (188 µg/m ³)	Same as primary	Same as federal
Ozone	8-hour ⁽⁴⁾	75 ppb (147 µg/m ³)	Same as primary	Same as federal
Particulate Matter greater than 10 micrometers (PM ₁₀)	24-hour ⁽⁵⁾	150 µg/m ³	Same as primary	Same as federal
Particulate Matter (PM _{2.5})	Annual ⁽⁶⁾	12.0 µg/m ³	15.0 µg/m ³	15.0 µg/m ³
	24-hour ⁽⁷⁾	35 µg/m ³	Same as primary	35 µg/m ³
Sulfur Dioxide	Annual	30 ppb (85 µg/m ³)	0.5 ppm (1,300 µg/m ³)	1-hour/0.035 ⁽⁹⁾ 24-hour/0.075 ⁽¹⁾ Secondary-same as federal
	24-hour	140 ppb (365 µg/m ³)		
	1-hour ⁽⁸⁾	75 ppb (196 µg/m ³)		
Hydrogen sulfide	No federal standard	No federal standard	No federal standard	Instantaneous 10 ppm (14 mg/m ³) ⁽¹⁰⁾ Annual/0.02 ppm (28 µg/m ³) ⁽⁶⁾ 24-hour/0.10 ppm (140 µg/m ³) ⁽¹⁾ 1-hour/0.20 ppm (280 µg/m ³) ⁽¹¹⁾

ppm = parts per million by volume; mg/m³ = milligrams per cubic meter of air; ppb = parts per billion by volume;

µg/m³ = micrograms per cubic meter of air

Source: USEPA 2013a; NDDH 2013.

⁽¹⁾ Not to be exceeded more than once per year.

⁽²⁾ The form of the 1-hour standard is the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum NO₂ concentrations.

⁽³⁾ Annual standards are arithmetic means.

⁽⁴⁾ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective 27 May 2008).

⁽⁵⁾ Not to be exceeded more than once per year on average over 3 years.

⁽⁶⁾ Annual arithmetic mean, averaged over 3 years

⁽⁷⁾ The 98th percentile of 24-hour concentrations averaged over 3 years

⁽⁸⁾ The 99th percentile of 1-hour concentrations averaged over 3 years.

⁽⁹⁾ The 98th percentile of 1-hour concentrations averaged over 3 years.

⁽¹⁰⁾ Not to be exceeded.

⁽¹¹⁾ Not to be exceeded more than once per month.

3.1.2 Existing Conditions

GFAFB is located in Grand Forks County, which is within North Dakota Air Quality Control Region (AQCR) 172. AQCR 172 consists of all counties in North Dakota with the exception of Metropolitan Fargo. As defined in 40 CFR 81.335, Grand Forks County is designated as attainment/unclassifiable for all criteria pollutants. The NDDH renewed GFAFB's Title V Permit to Operate, no. T5-F78004, in 2012 and it is good for 5 years.

3.2 WATER RESOURCES

3.2.1 Definition of the Resource

3.2.1.1 Groundwater

Groundwater is the water that is stored in, and moves through, spaces in underground layers of soil, sand, and rock, and are known as aquifers (The Groundwater Foundation 2012). The speed at which water moves through an aquifer is dependent on size of the spaces in the soil or rock and how these spaces are connected. The water in aquifers is discharged to the surface through springs into lakes and streams. It can also be brought to the surface through wells. Groundwater is recharged by rain and snow melt. Shortages occur when groundwater is used faster than it is recharged. The SDWA is primarily administered by USEPA, which sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards.

3.2.1.2 Surface Water

Surface waters are primarily lakes, rivers, estuaries, coastal waters, and wetlands. The NDDH has several programs that deal with various aspects of protecting the quality of water resources in the state. Some of these programs are from the USEPA delegating authority to issue and enforce permits to ND, while others result from laws and regulations promulgated by the ND legislature. ND Water Quality Standards are presented in the ND Century Code (NDCC) Chapter 33-16.

The principal laws governing pollution of the nation's surface water resources are the federal Water Pollution Control Act of 1972, or Clean Water Act (CWA), and Safe Drinking Water Act (SDWA). The Acts use water quality standards, permitting requirements, and monitoring to protect water quality. The USEPA sets the standards for water pollution abatement for all waters of the US under the programs contained in the CWA; however, in most cases, gives qualified states the authority to issue and enforce permits. For this analysis, water resources include surface water, groundwater, wetlands, and floodplains.

Impaired waters are those surface waters with levels of pollutants that exceed state water quality standards. Every 2 years, states must publish lists (referred to as 303[d] lists) of those rivers, streams, and lakes that do not meet their designated uses because of excess pollutants. Total maximum daily loads (TMDLs) of pollutants for the listed water bodies are established by the NDDH and approved by USEPA (2008b).

3.2.1.3 Wetlands

The USACE defines wetlands (in 33 CFR 328.3[b]) as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." The USACE Wetland Delineation Manual defines wetlands as areas that have positive indicators for hydrophytic vegetation, wetland hydrology, and hydric soils (Environmental Laboratory 1987). Wetlands provide rich habitat for a diverse range of plant and animal species, protection from flooding and erosion, and are also important to the nutrient cycle.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the USACE, to issue permits for the discharge of dredged or fill material into waters of the US, including wetlands. Waters of the US (33 CFR Section 328.3[a]) are those waters used in interstate or foreign commerce, subject to ebb and flow of tide, and all interstate waters including interstate wetlands.

Traditional navigable waters (TNWs) and their adjacent wetlands are jurisdictional (USEPA 2007). Likewise, non-navigable tributaries of TNW that are relatively permanent waters (RPWs) and typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), as well as wetlands that directly abut such tributaries are jurisdictional. In general, a seasonal RPW is synonymous with intermittent and a year-round RPW with perennial stream systems.

EO 11990, Protection of Wetlands, requires federal agencies to minimize the destruction, loss or degradation of wetlands, both jurisdictional and non-jurisdictional, and preserve and enhance the natural and beneficial values of wetlands. It also requires that agencies avoid construction, or providing financial assistance for new construction, located in wetlands to the extent practicable. When actions cannot completely avoid adverse effects on wetlands, the Federal agency must prepare a Finding of No Practicable Alternative (FONPA) and obtain all applicable and appropriate permits from the authorized regulatory agencies and follow required mitigation measures when necessary.

Department of Defense (DOD) Instruction (DODI) 4715.03 establishes policy for compliance with applicable federal, state, and local statutory and regulatory requirements, EOIs, Presidential memorandums, and other DOD policies for the integrated management of natural resources including lands, air, waters, coastal, and nearshore areas managed or controlled by DOD.

According to the Instruction, the principal purpose of DOD lands, waters, airspace, and coastal resources is to support mission-related activities. Natural resources conservation programs must guarantee DOD continued access to its land, air, and water resources for realistic military training and testing. DOD installations must also demonstrate stewardship of natural resources in their trust by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services. The lands, waters, airspace, and coastal resources must be managed for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.

DOD components, such as GFAFB, are directed to use a watershed-based approach to manage operations, activities, and lands so as to avoid or minimize impacts to wetlands, groundwater, and surface waters on or adjacent to installations. With respect to wetlands, DODI 4715.03 states the following:

- (1) DOD components shall ensure no net loss of size, function, and value of wetlands, and will preserve the natural and beneficial values of wetlands in carrying out activities in accordance with EO 11990 and the White House Office on Environmental Policy *Protecting America's Wetlands: A Fair, Flexible, and Effective Approach*, issued 24 August 1993.
- (2) When avoidance of wetlands and other waters of the US is not practicable, and impacts have been minimized, participation in an approved off-site mitigation bank or in-lieu fee instrument is encouraged as sound conservation planning. Off-site mitigation may provide a preferred alternative to meet watershed protection and ecosystem goals and meet future mission requirements. The enhancement, creation, or restoration of wetlands or streams on DOD property may also be an acceptable means for mitigating mission impacts on wetlands.
- (3) In the event that discharges of pollutants into wetlands or other US waters are necessary, DOD installations must obtain appropriate permits and complete mitigation.

3.2.1.4 Floodplains

Floodplains are defined by the Federal Emergency Management Agency (FEMA) as the lowland and relatively flat areas adjoining inland and coastal waters including, at a minimum, that area subject to a 1 percent or greater chance of flooding in any given year (44 CFR 9.4), which is known as the 100-year flood. EO 11988, Floodplain Management, requires federal agencies to avoid, to the extent practicable,

adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development. Floodplains provide for flood and erosion control support that helps maintain water quality and contribute to sustaining groundwater levels. Activities within a floodplain have a potential to affect the flooding of lands downstream of the activity. Floodplains also provide habitat for plant and animal species, recreational opportunities and aesthetic benefits.

3.2.1.5 Stormwater Management

Section 438 of the EISA requires that any federal development with a footprint that exceeds 5,000 ft² must maintain or restore pre-development hydrology. Agencies have two options to demonstrate that they are maintaining pre-development hydrology: managing on-site the total volume of rainfall from the 95th percentile storm or managing on-site the total volume of rainfall based on a site-specific hydrologic analysis. Federal agencies can comply with Section 438 by using a variety of stormwater management practices that are low impact including, for example, reducing impervious surfaces by using vegetative landscapes, porous pavements, cisterns and green roofs.

The CWA also regulates point discharge of pollutants to receiving waters of the US under the National Pollutant Discharge Elimination System (NPDES) program administered by the USEPA or authorized states (NDDH is authorized to implement the NPDES program). The NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 ac or more, including smaller sites in a larger common plan of development or sale, to obtain coverage under an NPDES permit for their stormwater discharges. Generally, construction sites can be covered under the state's General Permit for Construction, which requires, in most cases, the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP).

DOD environmental regulations require installations to have detailed spill control and response procedures and to implement stormwater pollution prevention BMPs. Each installation maintains base-wide stormwater protection measures; Spill Prevention, Control, and Countermeasures (SPCC) Plans; and Hazardous Materials Management Plans. Compliance with these plans reduces the potential for adverse effects on water quality.

3.2 Affected Environment

3.2.2.1 Groundwater

Groundwater in Grand Forks County occurs in unconsolidated glacial drift aquifers, and in rocks of Cretaceous and Ordovician age underlying the glacial deposits. The two primary aquifers underlying GFAFB are the Emerado Aquifer and the Dakota Aquifer. The Emerado Aquifer is a major glacial drift aquifer underlying GFAFB approximately 50 to 75 feet below ground surface. Water quality in the Emerado Aquifer is generally poor, probably due to upward leakage of poor-quality groundwater from underlying bedrock aquifers. The principal bedrock aquifer in the area is the Dakota Aquifer, which is a widespread regional aquifer present in most of the Great Plains states. Wells tapping the Dakota Aquifer in the vicinity of GFAFB are generally in the 100- to 200-foot depth range. The primary use of groundwater from the Dakota Aquifer is livestock watering. Groundwater quality is very saline and generally unsuitable for domestic and most industrial uses (GFAFB 2011).

3.2.2.2 Surface Water

GFAFB is located within the Red River Basin. The Red River originates in northeastern South Dakota, and flows northward forming the border between North Dakota and Minnesota. The Turtle River is a tributary to the Red River that drains approximately 311 mi², including GFAFB. The headwaters (North and South Branch) of Turtle River originate approximately 10 mi west of GFAFB, and the river flows in an east-northeast direction joining the Red River approximately 25 mi northeast of GFAFB (GFAFB 2011). The NDDH has designated the Turtle River a Class II stream under its Water Quality Standards (in NDCC 33-16-02), which means it may require additional treatment to meet drinking water standards, but can be used for irrigation, propagation of life for resident fish species, and water recreation. Streams in this

classification may be intermittent making them less beneficial to uses such as municipal water, fish life, irrigation, bathing, or swimming (NDDH 2010). The 25.27-mi section of the Turtle River (Waterbody ID: ND-09020307-019-S_00) into which the project area flows is listed as impaired under CWA Section 303d by the NDDH Water Quality Division for arsenic, cadmium, fecal coliform, and selenium (NDDH 2012).

3.2.2.3 Wetlands

The Red River Basin contains thousands of natural wetlands and prairie potholes. These wetlands have a profound effect on the hydrologic flow regime of streams and the residence time of water within the basin. Wetlands on GFAFB occur frequently in drainage ways, low-lying depressions, and potholes. Previous wetland assessments conducted at GFAFB include a wetland identification and delineation from 1999, a site-wide wetland assessment and summary in 2004, a site-specific wetland delineation of the new proposed fire station area in 2005, a selected wetland delineation in 2006, a wetlands characterization project in 2007, a wetland inventory and assessment in 2011, and two project/site-specific wetland delineations conducted in 2012. All of these efforts have been compiled into comprehensive GIS files.

Due to the presence of potential wetland features, a wetland delineation was conducted for the entire project area. The wetland delineation report *Wetland Delineation Final Report Proposed Mixed-Use Business Park on an Enhanced Use Lease at Grand Forks Air Force Base, North Dakota*, August 2013, was submitted to the USACE with a request to verify results and determine whether the features identified in the report as wetlands or waters of the US would fall under USACE jurisdiction and be subject to a CWA 404 permit for any the discharge of dredged or fill material into waters of the US. The USACE Jurisdictional Determination is included in **Appendix D**.

Wetland delineation field surveys were conducted on the 217-ac project area in June and July 2013. The resulting effort identified 32 wetlands totaling 23.795 ac within the project boundary (**Figure 3-1**). Of the 23.795 ac of wetlands delineated, 11 wetlands totaling 14.069 ac exhibited a physical connection to wetlands that had been identified as jurisdictional in previous studies (GFAFB 2012) and eventually connected to downstream TNW. No physical connection to other wetlands or TNW was observed for the remaining 21 wetlands mapped in the project area that totaled 9.726 ac. All 32 wetlands within the project area were categorized as palustrine emergent (PEM) wetlands (GMI 2013). The wetlands, size, and whether they are jurisdictional or isolated are listed in **Table 3-2**.

3.2.2.4 Floodplains

The 100-year floodplain of the Turtle River is located in the northwest corner of GFAFB. A portion of the 100-year floodplain of a tributary to Kelly's Slough is located in the southeast corner of the base near the sewage lagoons (GFAFB 2011). None of the project area is within the 100-year floodplain.

3.2.2.5 Stormwater Management

Runoff at GFAFB flows primarily into grassy drainage ditches on the west, northwest, north, and south sides of the installation. From these ditches, runoff drains north and west into Turtle River or east into Kelly Slough, a tributary to Turtle River, through outfalls permitted by the NDDH for storm water discharges from an industrial activity (Permit #NDR02-0314). The project area drains northward through three ditches that eventually feed into the West Ditch, which also collects runoff from the runways, before turning west to discharge into Turtle River.

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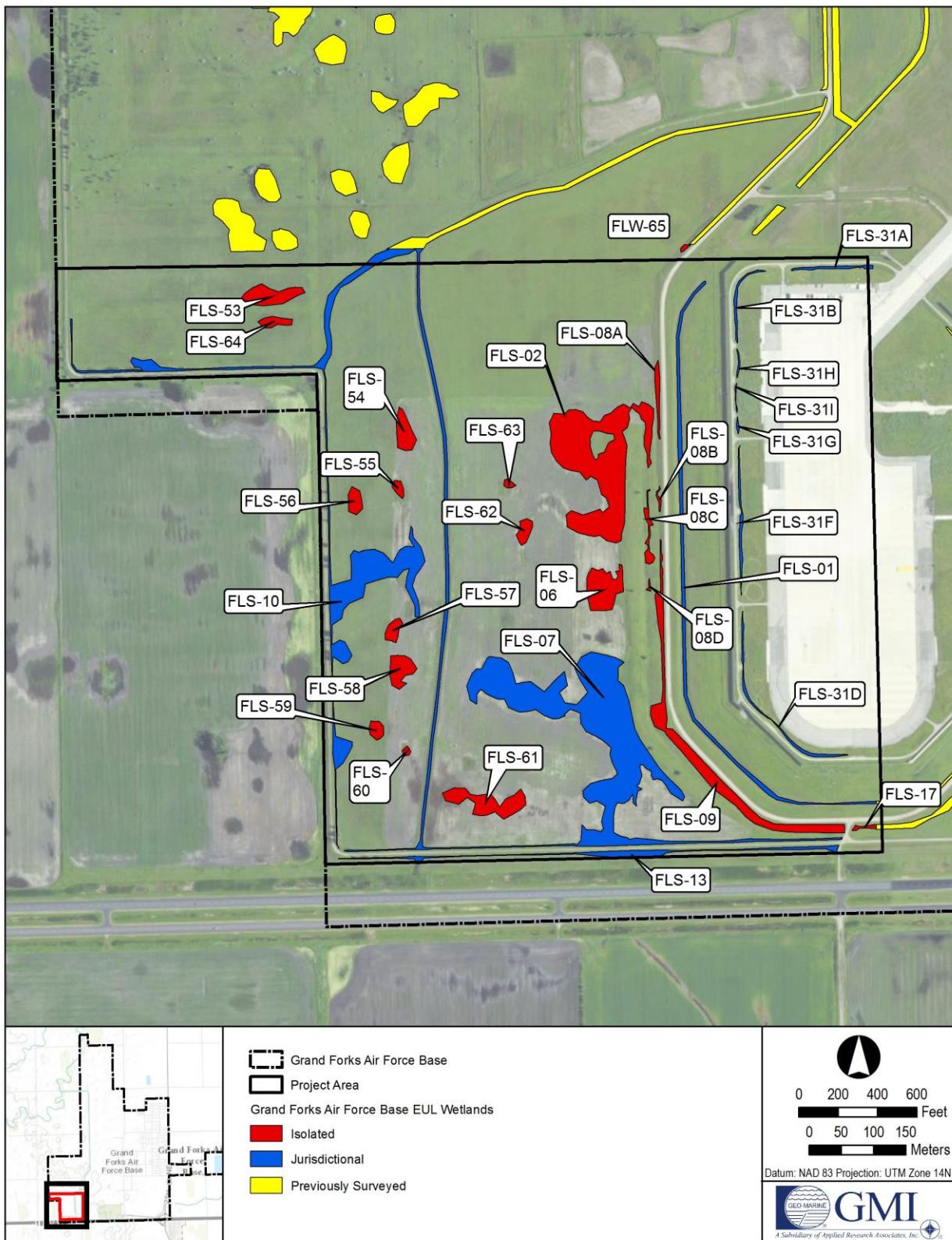


Figure 3-1. Jurisdictional and isolated wetlands within the project area (GMI 2013; USACE 2013).

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**Table 3-2. Wetlands delineated in project area and jurisdictional determination by
United States Army Corps of Engineers (GMI 2013; USACE 2013)**

Wetland number	Size (ac)	Jurisdictional	Isolated
FLS-01	1.149	X	
FLS-02	4.048		X
FLS-06	0.730		X
FLS-07	8.011	X	
FLS-08A	0.144		X
FLS-08B	0.030		X
FLS-08C	0.143		X
FLS-08D	0.012		X
FLS-09	1.686		X
FLS-10	3.650	X	
FLS-13	0.614	X	
FLS-17	0.042		X
FLS-31A	0.115	X	
FLS-31B	0.107	X	
FLS-31D	0.213	X	
FLS-31F	0.161	X	
FLS-31G	0.014	X	
FLS-31H	0.023	X	
FLS-31I	0.011	X	
FLS-53	0.504		X
FLS-54	0.332		X
FLS-55	0.079		X
FLS-56	0.181		X
FLS-57	0.153		X
FLS-58	0.354		X
FLS-59	0.130		X
FLS-60	0.033		X
FLS-61	0.743		X
FLS-62	0.163		X
FLS-63	0.041		X
FLS-64	0.158		X
FLS-65	0.022		X
Totals	23.795	14.069	9.726

3.3 BIOLOGICAL RESOURCES

3.3.1 *Definition of the Resource*

Biological resources include plant and animal species and the habitats in which they occur. For this analysis, biological resources are divided into the following categories: vegetation, wildlife, and protected species. Vegetation and wildlife refer to the plant and animal species, both native and introduced, which characterize the region. Protected species are plant and animal species in need of protection to ensure that the species do not decline to extinction.

3.3.1.1 Vegetation

The Federal Noxious Weed Act (7 USC 2801 et seq.), enacted in January 1975, established a federal program to control the spread of noxious weeds. It gave the Secretary of Agriculture authority to designate plants as noxious weeds by regulation, and to inspect, seize and destroy products, and to quarantine areas, if necessary to prevent the spread of such weeds.

EO 13112, *Invasive Species*, was issued in 1999 to enhance federal coordination and response to the complex and accelerating problem of invasive species. The EO defines an invasive species as a species not native to the region or area whose introduction (by humans) causes or is likely to cause harm to the economy or the environment, or harms animal or human health (NISC 2005).

3.3.1.2 Wildlife

The Fish and Wildlife Coordination Act (16 USC 661-667e) requires consultation with the US Fish and Wildlife Service (USFWS) and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency under a Federal permit or license. The purpose of the act is to recognize the vital contribution of wildlife resources to the nation and to require equal consideration and coordination of wildlife conservation with water resources development programs.

3.3.1.3 Protected Species

The Endangered Species Act (ESA) provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing ESA are the USFWS and the US National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The law requires federal agencies, in consultation with the USFWS and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.

Under the ESA (16 USC 1536), an "endangered species" is defined as any species in danger of extinction throughout all or a large portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. USFWS/National Marine Fisheries Service (NMFS) also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, USFWS/NMFS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant future protection under the ESA. The USFWS also maintains a species of conservation concern list. This list includes unprotected species that are likely to become candidate species in the future under the ESA.

The Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668a-d) was enacted to protect America's national symbol, the bald eagle (*Haliaeetus leucocephalus*). The golden eagle is a similar-appearing eagle, especially in immature life stages, and, therefore, was added to ensure protection of the bald eagle. The BGEPA, originally passed in 1940 and as amended, provides for the protection of the bald eagle and the golden eagle (*Aquila chrysaetos*) by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or

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dead, including any part, nest, or egg, unless allowed by permit. The USFWS defines disturbance to eagles as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information (1) injury to the eagle, (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment" (50 CFR Part 22.3).

The Migratory Bird Treaty Act (MBTA) (16 USC 703-712) authorizes the US commitment to comply with international conventions (i.e., with Japan, Russia, Canada, and Mexico) for the protection of migratory bird resources. The conventions protect selected species of migratory birds that occur in the US and each country at some time during the annual life cycle of the species. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was signed by President Clinton in January 2001. The EO directs executive departments and agencies to take further actions to implement the MBTA by developing a Memorandum of Understanding with the USFWS to promote the conservation of migratory bird populations.

In addition to Federal laws, there are several programs involved with bird conservation. Each of these programs has a list of birds they are concerned with protecting. The DOD Partners in Flight (PIF) program is a cooperative, non-advocacy partnership among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. PIF was founded in 1990 in response to declining populations of migratory birds, and to provide for conservation of birds not covered by existing conservation initiatives. DOD bird conservation programs are a vital part of this initiative. The DOD PIF program supports and enhances the military mission while it works to develop cooperative programs and projects with PIF partner organizations ensuring a focused and coordinated approach for the conservation of resident and migratory birds and their habitats (DOD PIF 2011).

The 1988 amendment to the Fish and Wildlife Conservation Act mandated USFWS to identify species, subspecies, and populations of all nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. Birds of Conservation Concern 2008 (USFWS BCC 2008) is the most recent list identifying non-federally listed migratory and non-migratory bird species that represent the highest conservation priorities. The BCC list is available at national and regional scales; the region encompassing GFAFB is the Prairie Pothole Bird Conservation Region.

North Dakota has no state endangered species act, but in 1975 the ND Legislature passed the Nature Preserves Act (NDCC 55-11), which gives the ND Parks and Recreation Department the responsibility to set aside a system of natural areas and nature preserves for the benefit of ND citizens. Under this act, the department administers programs for Nature Preserves, Natural Areas Registry, and the Natural Heritage Inventory. This Natural Heritage Inventory lists animal and plant species of concern within the state, and ranks them by using an accepted international system. Species are ranked on a 1 to 5 scale, based on number of known occurrences, threats, sensitivity, area occupied, and other biological factors throughout the species' range.

3.3.2 *Affected Environment*

3.3.2.1 Vegetation

GFAFB is located within the tall-grass prairie portion of the bluestem prairie region. Historically, tall-grass and mixed grass prairie communities dominated this region and their deep roots formed a thick and continuous layer. The historic bluestem prairie was bounded by forested areas to the east and short-grass plains to the west. Trees and shrubs were scarce, and generally limited to riparian areas and other depressions. Very little of the former bluestem prairie remains intact, as much of the remaining area not lost to agriculture has undergone invasion by trees and shrubs due to lack of fire and the grazing of large herds of bison. Fire, acting in conjunction with topography and climatic variation, positively influences tall-grass prairie diversity and composition.

Current vegetation on GFAFB largely stems from planting that occurred in the 1950s once initial construction of the base was complete. GFAFB was planted with a DOD-established grass mix, including three introduced cool season grasses that continue to dominate the majority of the base today; smooth brome (*Bromus inermis*), red fescue (*Festuca rubra*), and Kentucky bluegrass (*Poa pratensis*). Certain areas of the base, including 70 acres of the project area, were reseeded during the 2010-2011 growing season with native grasses (warm and cool season), including western wheat grass (*Pascopyrum smithii*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), sideoats grama (*Bouteloua curtipendula*), Indian grass (*Sorghastrum nutans*), and others. The area of the base where the development would occur has been undergoing conservation management for prairie grassland as described in detail in the base's Integrated Natural Resources Management Plan (INRMP).

In 2005, hay restoration was conducted in some of the hayfield lease areas including the southern half of the hayfield that extends into the northeastern corner of the project area with 23 ac of overlap. The area was reseeded with a mixture of native grasses such as western wheat grass, slender wheatgrass (*Elymus trachycaulus*), green needlegrass (*Nassella viridula*), sideoats grama, and switchgrass. In addition to the hay, much of the project area is categorized as disturbed lowland (wet) prairie, sedge meadows, and shallow marsh. This wet prairie community consists of prairie pothole marshes formed in moraines of undulating glacial till throughout the northern plains. The classification of wetlands on the project area and determination of whether they fall under the jurisdiction of the USACE is discussed in **Section 3.2, Water Resources.**

Noxious weeds have been an increasing issue at GFAFB. The current list of noxious weeds on GFAFB includes absinth wormwood (*Artemisiaabsinthium*), Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), field bindweed (*Convolvulus arvensis*), leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), spotted knapweed (*Centaurea maculosa*), and perennial sowthistle (*Sonchus arvensis*). Canada thistle was recorded as moderately abundant in the project area during 2008-2009 biological surveys (GFAFB 2011).

3.3.2.2 Wildlife

GFAFB supports a diversity of wildlife species nestled in an agricultural landscape. Wildlife species observed on the base range from small mammals, such as mice, to larger ungulates, such as white-tailed deer (*Odocoileus virginianus*). A diverse group of migratory birds, including waterfowl and neo-tropical migrants, have also been observed on base. The base contains limited fish habitat; low water levels within wetlands, drainage channels, the reflection pond, and stormwater detention areas are generally insufficient to support fish populations (GFAFB 2011).

The mammals observed at GFAFB are primarily small mammals common to grassland habitats, including the plains pocket gopher (*Geomys bursarius*), the Richardson's ground squirrel (*Spermophilus richardsonii*), the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), the white-tailed jackrabbit (*Lepus townsendii*), and the striped skunk (*Mephitis mephitis*). All of these species are common to eastern North Dakota. The most common of the larger mammals is the white-tailed deer found mostly in the western and southern portions of the base. Other large mammals observed on-base include coyotes (*Canis latrans*) and moose (*Alces alces*) (GFAFB 2011).

Although no formal survey has been conducted for amphibians and reptiles on the base, two reptiles and four amphibians have been observed at GFAFB during the recent and past biological surveys. Amphibians observed include two species of concern, the northern leopard frog (*Rana pipiens*), an S1 state-ranked species and under review for listing as a federally threatened species in the western US, and the Canada toad (*Bufo hemiophrys*), also known as the Dakota toad and identified as a Level I Species of Conservation Priority (Hagen *et al.* 2005). Other amphibian species observed on base are the American toad (*Bufo americanus*), and wood frog (*Rana sylvatica*). Reptiles observed on base include the common garter snake (*Thamnophis sirtalis*) and painted turtle (*Chrysemys picta*). Tiger salamanders (*Ambystoma tigrinum*) and chorus frogs, although not documented to occur on base during the 2009

Biological Survey, are common amphibians found in prairie wetlands and potentially occur on base (GFAFB 2011).

There are 229 bird species known to occur on GFAFB with 105 breeding species recorded. Forty-two of those species have been recorded on the project area. Grassland and wetlands provide important habitat for grassland birds like the upland sandpiper. Prairie potholes are a rich and very important habitat type particularly in regard to their value as the sole breeding habitat for many waterfowl species and as stopover sites for resting and feeding for all types of birds. The most common species observed utilizing the base include red-winged blackbird (*Agelaius phoeniceus*), mourning dove (*Zenaida macroura*), clay-colored sparrow (*Spizella pallida*), and American goldfinch (*Carduelis tristis*).

3.3.2.3 Protected Species

No federally listed threatened or endangered species are known to occur on GFAFB (GFAFB 2005). There is no critical or significant habitat present on GFAFB. Species listed by the USFWS as endangered and having the potential to reside within Grand Forks County include the gray wolf (*Canis lupus*) and whooping crane (*Grus americana*). Neither of these species has ever been documented on or near GFAFB.

Previous lists of threatened or endangered species that may be present in Grand Forks County also contained the bald eagle (*Haliaeetus leucocephalus*). On 28 June 2007, the bald eagle was formally removed from the list of federally threatened and endangered species (50 CFR 17); however, it remains federally protected by both the Bald and Golden Eagle Protection Act (16 USC 668a-d) and the MBTA (16 USC 703-712). Bald eagles have been observed at GFAFB harassing waterfowl near the sewage lagoons, feeding on road kill in the area, and hunting in the Turtle River riparian area. There is a documented bald eagle nest approximately 2 mi east of the installation on the west side of Kelly's Slough National Wildlife Refuge. During the 2009 winter bird survey (GFAFB 2010), a bald eagle was observed near the Turtle River riparian area. Golden eagles (*Aquila chrysaetos*) also have been observed migrating through the area during the spring time near the sewage lagoons in 2009 and 2010 (North Wind 2011).

Although not currently listed on the federal threatened or endangered species list, the northern leopard frog (*Rana pipiens*) is a candidate for listing as threatened under the ESA (USFWS 2009a). The northern leopard frog has been observed at GFAFB. The northern leopard frog is designated a “sensitive species” in U.S. Forest Service Region 1 (Northern Region—northern Idaho, Montana, North Dakota, northwest South Dakota) although sensitive species status does not provide any special protection (GFAFB 2011).

Sprague’s pipit (*Anthus spragueii*), a candidate species under the ESA and a species of concern by several conservation programs, is an uncommon breeding resident of North Dakota that nests on the ground in native grasslands of intermediate height (North Wind 2011). Although this bird has not been observed at GFAFB, it has been documented in the Oakville Prairie located just southeast of the installation.

For GFAFB’s INRMP, the list of species present on the base was compared to the various lists of species of concern created by the conservation programs mentioned in Section 3.3.1 and compiled to create a comprehensive GFAFB “Species of Concern” list to document species observed and recorded on GFAFB. From that list, 72 species (64 birds, 4 plants, 2 mammals, and 2 amphibians) have been documented on GFAFB (North Wind 2011). The list from the INRMP is included in **Appendix E**. Further sorting this list by just those bird species of high priority concern and those that have been recorded on the project’s 217 ac produced a list of 24 species of concern that could potentially be found in the habitat found on the project area. Of these species, seven have been sighted regularly in the project area during breeding bird surveys: bobolink (*Dolichonyx oryzivorus*), northern harrier (*Circus cyaneus*), sedge wren (*Cistothorus platensis*), sharp-tailed grouse (*Tympanuchus phasianellus*), short-eared owl (*Asio flammeus*), Swainson’s hawk (*Buteo swainsoni*), and upland sandpiper (*Bartramia longicauda*). In addition, a sharp-tailed grouse lek has been seen in the project area. All of these have been ranked as high priority for conservation management in the Species of Concern Management Plan (North Wind 2011).

Of the four plant species of concern, patches of white lady's slippers (*Cypripedium candidum*) and lesser yellow lady's slippers (*C. parviflorum* var. *parviflorum*) have been documented in the grassland/wetland area west of the flightline, including one patch within the northwest corner of the project area (North Wind 2011).

3.4 CULTURAL RESOURCES

3.4.1 *Definition of the Resource*

Cultural resources are prehistoric and historic sites, districts, structures, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. A historic district is an area that "...possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (NPS 2011).

Numerous laws and regulations require that possible effects on cultural resources be considered during the planning and execution of federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the federal agency proposing the actions, and prescribe the relationships among involved agencies. In addition to NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the NHPA (especially Sections 106 and 110), the Archaeological Resources Protection Act (ARPA), the American Indian Religious Freedom Act (AIRFA), and the Native American Graves Protection and Repatriation Act (NAGPRA). Section 106 of NHPA, as implemented by 36 CFR Part 800, requires that federal agencies give the ACHP a "reasonable opportunity to comment" on planned actions. Federal agencies must consider whether their activities could affect historic properties that are already listed, determined eligible, or not yet evaluated under the National Register of Historic Places (NRHP) criteria. Properties that are either listed on or eligible for listing in the NRHP are provided the same measure of protection under Section 106. In addition to the ACHP, Air Force Instruction AFI 32-7065 requires that consultations between the Air Force and Indian Tribes are conducted on a government-to-government basis and that the consultation process be completed prior to finalizing any NEPA documents (EA/FONSI).

The following criteria have been established as guidance for evaluating potential entries to the NRHP. "Significance" in American history, architecture, archeology, and culture is granted to districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that meet at least one of the following criteria:

- An association with events that have made a significant contribution to the broad patterns of history (Criterion A)
- An association with the lives of persons significant in history (Criterion B)
- Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguished entity whose components may lack individual distinction (Criterion C)
- Have yielded, or may likely yield, information important in prehistory or history (Criterion D)

Resources less than 50 years of age must be evaluated under Criterion Consideration G: Properties That Have Achieved Significance in the Last Fifty Years. This criterion requires that such resources be "exceptionally important" to qualify for listing. Resources less than 50 years of age must also meet the criteria for resources 50 years or older (i.e., A, B, C, or D) and retain their integrity.

3.4.2 *Existing Conditions*

The APE for cultural resources is the entire 217-ac proposed action site. No specific cultural resources surveys were conducted for this proposed action.

3.4.2.1 Previous Investigations at Grand Forks Air Force Base

A 235-ac area on GFAFB was surveyed for cultural resource properties by the UND Archaeological Research in 1989. Two sites and three isolated finds were identified (Artz 1989). In 1995 and 1996, a Class III intensive archaeological survey of GFAFB was conducted by Parsons Engineering Science. The survey identified four sites and three isolated finds. All six sites and six isolated finds were determined not eligible for inclusion in the NRHP (Crane et al. 1996; SAIC 2011). This latter survey covered roughly the northern half of the APE, which was considered to have a high to medium potential for the presence of cultural resources. The southern half of the APE was thought to have a low probability for having cultural resources (GFAFB 2012a).

In 1998, the north and south rights-of-way of portions of US-2 were surveyed for cultural resources for the NDDOT. No prehistoric or historic cultural resource sites were observed within the inventory area (GFAFB 2012a).

In 1996, Geo-Marine, Inc. conducted an inventory of 27 buildings located at GFAFB. There are no longer any buildings within the APE; the buildings on the Alpha Ramp had not been recommended for inclusion on the NRHP. Additionally, an inventory and evaluation of all buildings and structures built between 1956 and 1964 was conducted in 2011. The survey found no cohesive Cold War landscape or potential base historic district (SAIC 2011).

Although there is not any evidence of Native American sacred sites or other properties or resources of traditional religious and cultural importance within the APE for this proposed action, GFAFB corresponded with federally recognized tribes that are or may be affiliated with the area comprising the installation. GFAFB also corresponded and consulted with the SHPO, any authorized THPOs, and/or the assigned ACHP representative as needed or required to determine whether there are any areas or property of concern involving the proposed business development site. The 319 ABW Commander and the CRM at GFAFB sent letters on 22 October 2013, notifying the Tribes and the THPO of the proposed project, the APE, prior surveys and findings, and inquiring whether the Tribes desired to engage in consultations pursuant to the NHPA, Section 106. Historically, on prior projects sited on GFAFB, the Tribes have not requested Section 106 consultations and consistently replied that adverse effects to historic properties and resources would not occur and the consultation process was not necessary; therefore by 20 November 2013, during which time further follow-up by GAFB occurred (telephone calls and/or emails) since the October letters, the CRM reported that only one tribe, the CRST, requested Section 106 consultations on the proposed action. The THPO for the CRST had expressed concern that past surveys and data had not fully considered whether there were any items or resources of cultural or religious significance to the tribe. The CRST was particularly concerned that appropriate responses should occur in the event any gravesites or human remains were found during pre-construction and actual construction activities. Subsequently, the CRST requested the GFAFB visit the CRST for consultation purposes. The 319 ABW Vice Commander, CRM, Installation Support Team Cultural Resources, and AFCEC attended an onsite meeting on 05 Dec 2013 to open consultations, but due to a lack of obtaining Tribal quorum, were unable to accomplish that task. The 319 ABW Vice Commander followed up after the meeting by sending correspondence to the CRST on 20 December 2013 and invited them to visit the installation to view the APE. On 04 February 2014, the GFAFB sent a proposed MOU to the CRST to outline the purpose and need to engage in a base site visit allowing the CRST an opportunity to address their concerns. To preliminarily discuss the proposed MOU, the 319 ABW Vice Commander, the CRM and Air Force legal counsel participated in consultations through a teleconference on 19 February 2014 (due to Air Force travel budget constraints), with the CRST THPO and his invitees or representatives from the SRST, and the SWO. The Spirit Lake Tribe was invited by this group of Tribal Nations and agreed to participate later. The principal request by the Tribes was to access the APE on GFAFB to perform its own cultural resources survey and discuss inadvertent discoveries during pre-construction and construction activities of project development; thereafter, a MOU was drafted for the Tribes' review. Initial discussions had focused on a PA but were later changed to an MOU at the direction of the ACHP when the SHPO decided a PA was not necessary and only limited ACHP participation would be needed at this point. The 319 ABW evaluated the Tribes' review and comments of the draft and a Final MOU was prepared and

sent to the Tribes for its final review and final signatures. The Final MOU between GFAFB and the Tribes is found in **Appendix B** of this EA.

3.4.2.2 Previously Identified Archaeological Properties

Two archaeological sites and three isolated finds are within 1 mi of the APE. One isolated find, a distal portion of a flake and a calcined mammal bone, is on the northern boundary of the APE. All of these cultural resources have been determined not eligible for inclusion in the NRHP (Artz 1989; Crane et al. 1996; SAIC 2011).

3.4.2.3 Historic Resources (Buildings or Structures)

No historic resources have been identified within the APE.

3.5 HAZARDOUS MATERIALS AND HAZARDOUS WASTES

3.5.1 *Definition of the Resource*

The terms “hazardous material,” “hazardous waste,” and “hazardous substance” all have very specific legal and scientific definitions in federal regulations. “Hazardous materials” are defined under the US Department of Transportation (DOT) regulations (49 CFR Parts 100 through 199) as chemicals the Secretary of Transportation has determined to present risks to safety, health, and property during transportation. DOT regulations include requirements for shipping papers, package marking, labeling, transport vehicle placarding, and training of personnel handling hazardous materials.

“Hazardous wastes” are defined and regulated by the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA considers a waste hazardous if it meets certain levels of reactivity, ignitability, corrosivity, or toxicity, or is otherwise listed as a hazardous waste in 40 CFR Part 261. In general, RCRA regulations address day-to-day management of these wastes. RCRA regulations include very detailed and specific requirements for facilities that generate, transport, treat, store, or dispose of hazardous wastes.

The majority of RCRA-regulated hazardous waste is produced by large-quantity generators (LQGs), defined as facilities that produce 1,000 kilograms (kg; 2,200 pounds [lb]) or more of hazardous waste per month. Small-quantity generators (SQGs) are facilities producing more than 100 kg (220 lb) but less than 1,000 kg (2,200 lb) of hazardous waste per month. Wastes considered “acutely” hazardous are regulated at 1 kg (2.2 lb) per month. All generators, unless they are “conditionally exempt” SQG (those generating less than 100 kg per month), must treat, store, or dispose of their wastes at RCRA-permitted facilities.

“Hazardous substances” are defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) as chemicals that are harmful to human health or the environment if spilled or otherwise released into the environment. They are further defined as:

- Any element, compound, mixture, solution, or substance designated as hazardous under section 102 of CERCLA.
- Any hazardous substance designated under section 311(b)(2)(a) of the CWA, or any toxic pollutant listed under section 307(a) of the CWA. There are more than 400 substances designated as either hazardous or toxic under the CWA.
- Any hazardous waste having the characteristics identified or listed under section 3001 of the RCRA.
- Any hazardous air pollutant listed under section 112 of the CAA, as amended. There are over 200 substances listed as hazardous air pollutants under the CAA.
- Any imminently hazardous chemical substance or mixture which the USEPA Administrator has “taken action under” section 7 of the Toxic Substances Control Act (TSCA).

The definition of hazardous substance specifically excludes petroleum, including crude oil and any fraction thereof, unless specifically listed (40 CFR 300.5). Spills of oil and other petroleum products are regulated under the CWA when in areas where they will, or eventually could, enter waterways.

The Environmental Restoration Program (ERP) is used by the Air Force to identify, characterize, and remediate past environmental contamination on Air Force installations. Past procedures for managing and disposing wastes, although accepted at the time, resulted in contamination of the environment. The ERP has established a process to evaluate past disposal sites, control the migration of contaminants, identify potential hazards to human health and the environment, and remediate the sites.

3.5.2 Existing Conditions

GFAFB is a hazardous waste SQG (USEPA Identification Number ND3571924759). GFAFB does not maintain a permitted hazardous waste storage area. Hazardous waste generated at GFAFB includes bead blast media, spent solvents, stripping chemicals, waste paint and paint booth filters, antifreeze filters and sludge, waste amalgam (from dental lab), and shelf life expired materials (GFAFB 2012b). Aircraft maintenance facilities are the largest generators of hazardous waste at the installation, accounting for approximately 90 percent of hazardous waste (GFAFB 2012b).

GFAFB has seven ERP sites and two Areas of Concern (AOCs) that consist of historic landfills, fire training areas, past equipment maintenance activity areas, gasoline stations, and the bulk petroleum, oil, and lubricant transfer area (GFAFB undated). NDDH added 48 suspected AOCs to the ERP list in September 1993 that were then grouped with the ERP sites into 20 Solid Waste Management Units (SWMUs). The SWMUs are subject to RCRA Corrective Action and are regulated by a RCRA Corrective Action permit. Primary contaminants in soils and sediments include elevated levels of volatile organic compounds (VOCs), semivolatile organic compounds, polycyclic aromatic hydrocarbons, and total petroleum hydrocarbons (TPH). Primary contaminants in groundwater include fuels and solvents (USAF 2008a).

None of the ERP sites or AOCs are located within the project area. The closest ERP site is the Explosive Ordnance Detonation Area (EODA), OT-05, which consists of approximately 90 ac located just north of the panhandle portion of the project area. It was active from 1966 to 1993 and was used to explode unserviceable munitions, starter cartridges (pre-1980), and other small devices by burning or detonation. Elevated levels of lead were identified during site investigations; however, the results of the Total Concentration Leaching Potential analyses, the determination of whether the soils are a hazardous waste under RCRA (40 CFR 261.), were below detection limits, indicating that lead is unlikely to migrate in leachate from the EODA site. OT-05, EODA, is closed and no further response actions are planned. The NDDH approved no further action on 21 August 1995 (USAF 2006b).

While the Alpha Ramp was being used, there were three underground storage tanks (USTs) for storing diesel fuel for emergency power generation (Buildings B807, B849, and B859) and another UST for storing heating oil (also Building B807). When the two USTs at Building 807 were removed in 2008, petroleum-contaminated soil was encountered in the excavation of the 6,000-gallon UST used for heating oil. One of the soil samples collected contained 756 parts per million (ppm) of TPH. A groundwater sample collected from the excavation contained 1.1 ppm TPH. On the other side of Building 807, a 4,000-gallon UST that stored diesel for emergency power generation was also removed; however, there were no indications of contamination from the excavation (NDDH 2008). When a 2,000-gallon UST that had contained diesel for emergency power was removed in 2009, no contamination was found in the excavation (Legend 2009). Other than the sampling done during this tank removal, the soil and groundwater beneath the Alpha Ramp have not been sampled (Klaus 2013).

According to the NDDH UST Program, clean up levels in soil and groundwater are determined on a site-by-site basis, but in general, the action level for TPH in soils is 100 ppm and in groundwater 0.5 ppm (NDDH 2006). GFAFB has been operating a land treatment facility permitted by NDDH since December 1997. Petroleum contaminated soil and sludge are taken to the land treatment facility for treatment to reduce concentrations of petroleum constituents. Although no documentation is available to show

whether or not contaminated soil from the Building 807 UST removal was taken to the land treatment facility, that is the purpose of the facility so it would seem likely.

Alert aircraft were fueled and, if necessary, maintained on the Alpha Ramp. Aircraft believed to have been fueled on the Alpha Ramp include the B-52H/G, B1-B, KC-135A/R, KC-10, SR-71, F-101B, F-106, F-15, and F-16. Jet fuels including JP-4, JP-7, and JP-8 were used. Spills may have occurred during fueling or maintenance activities. No documented fires or crashes occurred on the Alpha Ramp; a previously reported fire of a B-52 on the Alpha Ramp actually occurred on the Charlie Ramp on the other side of the runway (Klaus 2013). There is no documentation of any spills or substances leaking through the pavement at the Alpha Ramp, although some minor spills may have gone unreported.

The USEPA has established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences; however, there have been no standards established for commercial structures. Radon gas accumulation greater than 4 pCi/L is considered to represent a health risk to occupants. Grand Forks County is listed in Zone 1 for radon. In Zone 1 areas, the predicted average indoor radon screening level is above the USEPA radon guideline of 4 pCi/L (USEPA 2013c). All facilities on GFAFB are required to be tested for radon, and if levels approach or exceed 4 pCi/L, proper features or equipment are installed to reduce exposure levels below a level of insignificance.

3.6 GEOLOGY AND SOILS

3.6.1 *Definition of the Resource*

Geological resources are the surface and subsurface materials of an area and their inherent properties, such as topography and soil composition. Topography is the surface configuration of the earth that includes natural or man-made changes in elevation and form, such as mountains or man-made hills. The term "soil" generally refers to unconsolidated materials overlying bedrock or other parent material. Soils are products of weathering and other physical and chemical processes that act on parent material. Soil characteristics can determine the ground's ability to support land-use activities.

3.6.2 *Existing Conditions*

GFAFB is in the Red River Region of the Central Lowland Physiographic Province, defined as the flat glacial Lake Agassiz Plain. The Red River currently flows through the middle of the Province (Bluemle and Biek 2007). Topography at the installation is relatively flat, gently sloped to the northeast, with elevations ranging from 900 to 880 ft above msl. In the vicinity of the installation, underlying Cretaceous bedrock belonging to the Belle Fourche, Mowry, New Castle, and Skull Creek Formations occur that are overlain by about 130 ft of glacial till and 95 ft of lacustrine deposits (Bluemle 1988; USAF 2010). Bedrock strata dip gently towards the center of the Williston Structural Basin in the west (USAF 2006a). The glacial deposits are composed of silts, clays, sand, and gravel generally 225 ft thick, comprised of approximately 95 ft of clay- and silt-rich deposits from glacial Lake Agassiz which covers approximately 130 ft of glacial till containing isolated deposits of sand and gravel (USAF 2006a).

Soils at the proposed development site consist of the Antler Mustinka silt loam which is poorly drained and ranges from moderately saline to nonsaline, and the Gilby Loam, also poorly drained but with nonsaline to very slightly saline characteristics. Surficial urban soils lie under the Alpha Pad (NRCS 2012).

3.7 LAND USE

3.7.1 *Definition of the Resource*

Land use describes the activities that take place in a particular area and generally refers to human modification of land, often for residential or economic purposes. It also refers to use of land for preservation or protection of natural resources. It is important as a means to determine if there is sufficient area for proposed activities and to identify any potential conflicts with local land use plans. This

section of the EA describes the on-base and off-base land-uses that could potentially be affected by the development, construction, and operation of a mixed-use business park.

Land uses are classified differently by the entities with jurisdiction over the area. The Air Force installation land use planning uses 12 general land use classifications for functional relationship analysis: Airfield, Aircraft Operations and Maintenance, Industrial, Administrative, Community (Commercial), Community (Service), Medical, Housing (Accompanied), Housing (Unaccompanied), Outdoor Recreation, Open Space, and Water (USAF 1998). The Grand Forks County Land Use Plan uses four broad categories: agricultural/vacant, residential, commercial/industrial, and institutional/public land (Grand Forks County 2006).

AFI 32-7062, *Air Force Comprehensive Planning*, outlines responsibilities for developing, implementing and maintaining General Plans. Two principal planning studies specific to an installation are prepared and maintained by the Air Force. The first is an Installation General Plan which is similar to a locality's Master Plan, covering land use, transportation, and capital improvement projects. To achieve the many goals and objectives specific to GFAFB's missions, policies and recommendations are identified in the Installation General Plan for preservation of flight line access for those uses that require it, and refraining from creating land uses that would be incompatible in areas of higher accident potential or predicted noise exposure. The second, an Air Installation Compatible Use Zone (AICUZ) study, has as its objective the prevention of encroachment by uses that would be incompatible with the mission of a military airfield. Land uses may be incompatible by virtue of: (1) being located in an area of increased aircraft accident potential; (2) being located in an area of higher than ordinary predicted noise exposure stemming from aircraft operations; or (3) having land uses that adversely affect operations at an airfield, e.g., tall structures or uses that emit smoke, light, or glare or attract birds.

Planning efforts off installation are undertaken by Grand Forks County, the township of Mekinock, and the incorporated municipalities lying within the county, principally the City of Emerado. The most recent iteration of a master plan developed by the County, the *Grand Forks County 2035 Land Use Plan*, was adopted in March 2006; there is no corresponding plan for the City of Emerado. The City of Emerado's jurisdiction includes all lands within the corporate limits of the City and an area extending 0.5 mi in all directions from the corporate boundaries of the City.

The Grand Forks County Land Use Plan takes into account current and future land use with the philosophy that promotes growth in areas with municipal services, allows for managed residential growth, and preserves open space including agriculture, recreation, and natural heritage and environmentally sensitive areas. As part of the land use plan, Grand Forks County maintains an Airfield Reserve Area in areas adjacent to major airfield facilities, including GFAFB, to prevent conflicting land uses within the County. The goals and policies work toward preventing incompatible uses within these areas and include: limiting rural residential developments in the Airfield Reserve Area to a density of one unit per 15 ac; preventing any additional rural development in the Accident Potential Zone (APZ); supporting the air transportation needs of the US military, the State of ND, the County, and local communities; and maintaining and enhancing the character of the area adjacent to the airfield for current and future missions of Air Force.

3.7.2 Existing Conditions

The affected environment consists of GFAFB and vicinity. Off-base resources consist of land immediately adjacent to GFAFB and include areas lying within Grand Forks County and the City of Emerado, ND.

3.7.2.1 Grand Forks Air Force Base Land Use

GFAFB occupies approximately 5,151 ac. The installation, near the center of Grand Forks County, is located primarily within the Mekinock Township and borders Blooming Township to the east, Chester Township to the southeast, and Oakville Township to the south.

The land use and visual characteristics of GFAFB are typical of most military installations (see **Figure 3-2**). The airfield consists of a single north-south oriented runway in the western half of the installation with the operations area, maintenance facilities, administrative areas, and residential areas in the eastern portions of the base. In addition to the airfield, the western portion of the installation consists of open space land uses. The most western portion, including the proposed project area, has been identified as unconstrained land that would be appropriate for aircraft operations and maintenance (GFAFB 2006). The areas along the edge of the runway and taxiways and to the north and south of the runway ends have restricted land use due to airfield safety criteria including height restrictions, lateral clearances, clear zones, and takeoff safety zones. Several outdoor recreational areas occur within these restricted areas including a golf course at the south end of the runway and a natural area at the north end of the runway.

The area immediately east of the runway and taxiways is used for airfield operations and maintenance and industrial uses. The administrative, community, medical, and housing areas lie to the east of these areas. Outdoor recreation areas and open space occur in the eastern portion of the installation as well.

A Clear Zone (CZ) is real estate shaped in a 3,000- by 3,000-ft square, centered on and abutting each end of a runway, and containing approximately 207 ac. Open space (undeveloped) and agricultural uses (excluding raising livestock) are the only uses deemed compatible in a CZ. The entire 414 ac lying within the two CZs at GFAFB are owned by the Air Force (on installation) and are within compatible uses. The eastern edge of the proposed development lies along the western edge of the southern CZ.

APZs I and II extend off base north and south of the installation, beginning where the CZ ends, and extending an additional 5,000 ft (APZ I) and 7,000 ft (APZ II). APZ I extends across the installation boundary and APZ II lies entirely off installation. The 1995 AICUZ Study indicated that land use within the APZs are undeveloped or in agricultural production (GFAFB 1995) and current conditions are similar.

3.7.2.2 Off Installation Land Use

GFAFB lies within the southeastern quadrant of the Mekinock Township within the central portion of Grand Forks County. In general, land use in Grand Forks County is mostly open and used primarily for agricultural purposes; however, an area of urban and suburban uses lie approximately 15 mi to the east within the Grand Forks metropolitan area. The proposed development area is up against the southwest corner of the GFAFB fence line. The land use to the west is agriculture and open space. US-2 is on the south side of the development with agricultural land extending south of the highway. The city of Emerado lies south of the southeast corner of the base, more than 1 mi east of the proposed development.

3.8 NOISE

3.8.1 *Definition of the Resource*

Noise is defined as a sound that, if loud enough, can induce hearing loss or is otherwise undesirable because it interferes with ordinary daily activities, such as communication or sleep. Sound becomes noise once a human reacts to it, most often in terms of annoyance. A human's reaction to noise varies according to the duration, type, and characteristics of the source; distance between the source and receiver; receiver's sensitivity; background noise level; and time of day. Noise (or sound level pressures [SLP]) interrelate and interact with other resource areas, principally land use and occupational health and safety, but they also influence biological and cultural resources as well.

SLP is measured as the decibel (dB), which when adjusted for human hearing is the A-weighted decibel or dB(A). The day-night average sound level (DNL) describes a receiver's cumulative noise exposure from all events occurring during a 24-hour period; events occurring between 10:00 PM and 7:00 AM ("environmental night") are increased by 10 dB to account for greater nighttime sensitivity to noise events. Based on an USEPA report (1974), hearing loss is not expected in people exposed to 75 DNL or less. The Air Force considers areas with DNL less than 65 to be acceptable for any use (Air Force 1998a). A more detailed discussion of noise and its measurement and effects is presented in **Appendix F**.

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

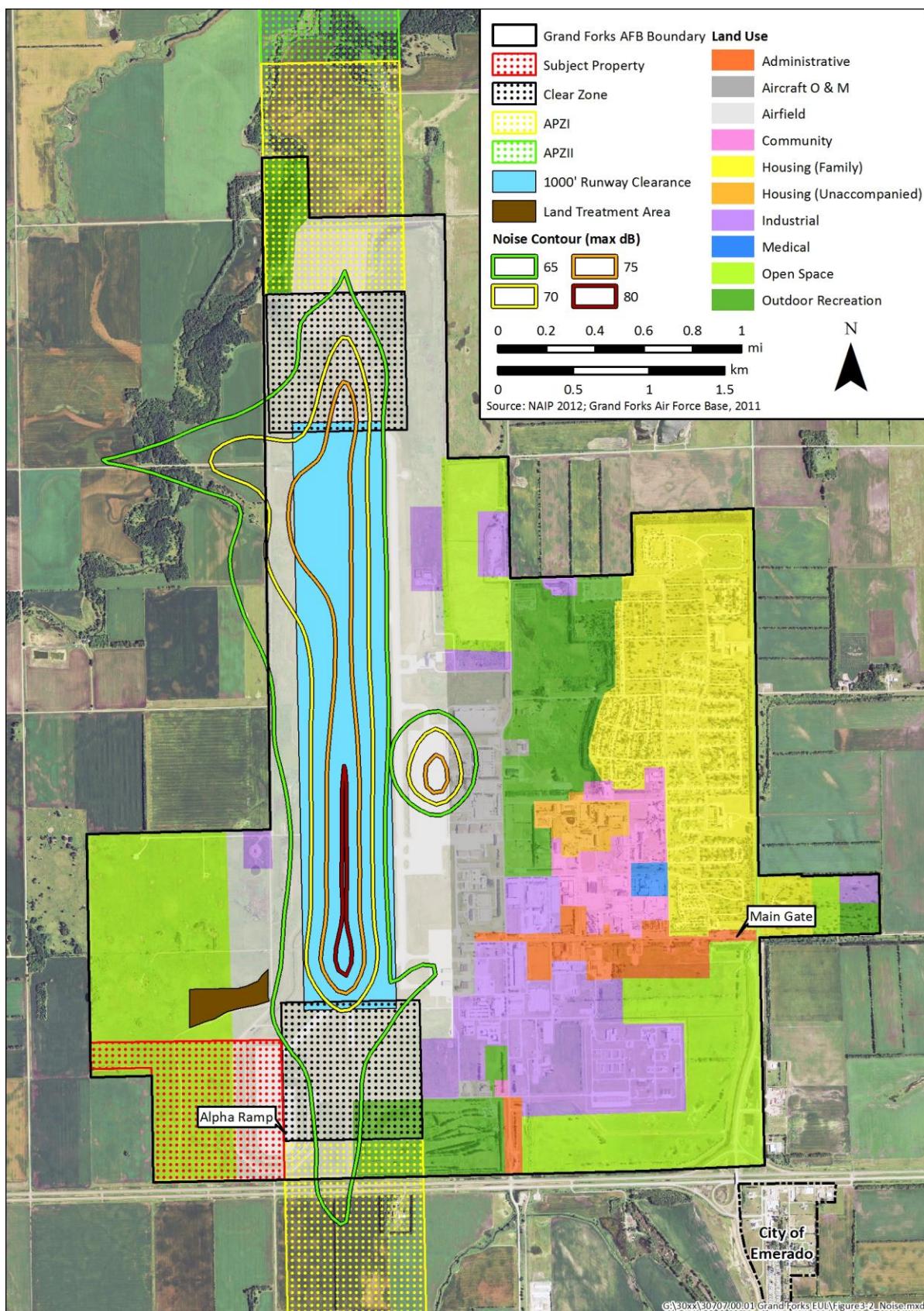


Figure 3-2. Noise contours and land use at Grand Forks Air Force Base.

3.8.2 Existing Conditions

GFAFB is in a rural setting with a relatively low ambient noise level. Daily sources of noise off base include vehicle noise, routine operation of equipment and machinery (e.g., generators, heating and air equipment), and operation of construction equipment. The noise environment at GFAFB primarily consists of noise created from aircraft operations. Currently, GFAFB operations include approximately 730 annual sorties, primarily Predator and Global Hawk RPAs, conducted approximately 200 days per year, which averages to approximately 3 to 4 sorties per day. Approximately 24 percent of these occur at night between 10:00 P.M. and 7:00 A.M (USAF 2010a).

The most recent AICUZ study conducted for GFAFB was in 1994 when they had approximately 30 KC-135R tanker flights per day (USAF 1995); the AICUZ report was revalidated in 2003, which negated the need to redo the study. A new AICUZ study has not been performed since the KC-135R tankers left GFAFB in December 2010. The noise contours from that AICUZ study are shown on **Figure 3-2**.

Under current operations no off-base residents are exposed to any noise greater than 65 dB (USAF 2010a). The on-base noise contours conform largely to the perimeter of the runway, and aircraft operations and maintenance areas including a small portion of the Alpha Ramp.

3.9 TRANSPORTATION

3.9.1 Definition of the Resource

For this evaluation, transportation is defined as the vehicular roadway system that enables persons and goods to move about a given area. The number of vehicles that can pass over a given portion of roadway during a specified period of time measures the roadway capacity. This capacity is usually considered in terms of levels of service, which is a qualitative measure describing operational conditions within a traffic stream; it is described in terms of speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

In traffic analyses, performance measures include level of service (LOS), delay, and volume-to-capacity (v/c) ratio. The LOS is a qualitative measure describing operational conditions within a traffic stream and motorists' perceptions of those conditions. In general, the following terms define the LOS (Rodrigue *et al.* 2009):

- A= Free flow
- B=Steady
- C=Steady but limited
- D=Steady at high density
- E=Saturated
- F=Congested

3.9.2 Existing Conditions

GFAFB is bounded by US-2 on the south and 25th Street NE (also known as Highway B-3) on the east, (see **Figure 1-1**). Primary access to the installation is by the main gate from 25th Street NE connecting to Steen Boulevard. A South Gate for limited access commercial traffic is along the southern base boundary, providing direct access from US-2 to Eielson Street, the main south to north arterial on the installation. Additional accesses are fenced and gated and only used for emergency access or maintenance. One of the additional accesses aligns with 27th Street NE across from where the business park development entrance is proposed.

US-2 in the vicinity of GFAFB is a four-lane divided highway with median crossings at intersections and an interchange at the 25th Street NE junction. The annual average daily traffic along US-2 near GFAFB is provided in **Table 3-3**. The Reference Post markers for the traffic data for US-2 are shown on **Figure 3-3**.

**Table 3-3. United States Highway 2 annual average daily traffic
near Grand Forks Air Force Base, North Dakota**

Highway Segment	Direction	Year	AADT	TAADT
RP 329 to RP 341	Eastbound	2011	2,191	574
RP 341.72 to RP 343.11	Eastbound	2011	3,188	728
RP 343.11 to 349.71	Eastbound	2011	4,045	780
RP 337 to RP 341	Westbound	2011	2,475	535
RP 341.53 to 342.70	Westbound	2011	2,706	539
RP 343.11 to 349.71	Westbound	2011	4,050	780

AADT = annual average daily traffic; TAADT = annual average daily traffic for trucks; RP = reference post
Source: NDDOT 2012.

LOS has not been calculated for this portion of US-2. According to the *Highway Capacity Manual* (Transportation Research Board [TRB] 1994), the maximum ideal lane capacity for a multilane highway segment is 2,200 vehicles per hour. Given that the annual average daily traffic (AADT) for the segments near GFAFB are only one to two times that number per day rather than per hour, the LOS should be A, for free flow.



Figure 3-3. Traffic count reference posts near Grand Forks Air Force Base (NDDOT 2012).

3.10 UTILITIES

3.10.1 *Definition of the Resource*

Utilities are defined as those services that provide amenities such as potable water, electric and natural gas supply, wastewater and stormwater management, and communications. The affected environment for the utilities resource is defined as the entire installation and includes the services provided by both on-installation facilities and off-installation providers.

3.10.2 Existing Conditions

NEC provides electrical power to GFAFB via two 69-kilovolt (kV) feeder lines. Two substations distribute power on the base, namely the Steen substation located at the intersection of the rail spur and Alert Avenue, and Eielson substation, located across County Highway B3 (USAF 2006a). The majority of the electrical system consists of underground lines. Emergency electrical power is supplied to critical facilities on the installation by emergency backup generators installed to support mission facilities, utility services, and contingency situations (USAF 2006a). The development would receive its power directly from NEC, although it would likely go through one of these two substations.

A 14-in water main from the City of Grand Forks enters the base near the main gate with 1.87 million gallons per day (gpd) pumping capacity. It is likely that the development would get its water delivered through an 8-in main from the Traill Rural Water District (TRWD).

The GFAFB sewage system is designed to feed sewage treatment facilities via a system of gravity and force mains with a total of nine lift stations in the total collection system at the installation. The sewage treatment system is operated by the base and located on base property less than 1 mi east of the base. The treatment system consists of four treatment cells: one primary, two secondary, and one tertiary cell. The discharge from the lagoon flows into the south drainage ditch, a primary drainage basin. The lift stations are for discharge into the primary lagoon cell. As of 2010 the lagoons had ample capacity for future base expansion (USAF 2010b). Sewage treatment is the only utility that would be provided by GFAFB.

Storm water at GFAFB is managed through open channels, catch basins, and underground concrete pipes guiding flow through unpaved ditches (USAF 2010b). Storm water leaves the installation through nine storm water outfalls including the southeast, northeast, northwest, and west ditches. The installation operates under a North Dakota Pollutant Discharge Elimination System (NDPDES) Industrial Storm Water Permit (Permit No. NDR05-0000). The permit authorizes the discharge of storm water associated with industrial activity to surface waters, in accordance with effluent limitations, monitoring requirements, and other conditions.

Under Section 438 of the EISA, federal projects that exceed 5,000 ft² are required to maintain or restore natural hydrology to the maximum extent technically feasible (USEPA 2009). Technical guidance has been developed by the USEPA, in close coordination with other federal agencies, for the implementation of Section 438. This guidance generally focuses on methods for retaining rainfall on-site through infiltration, evaporation/transpiration, and reuse to the same extent that occurred prior to development. Practices commonly used to comply with Section 438 include reducing impervious surfaces, using vegetation, porous pavement, cisterns, and green roofs.

The communications system on the installation consists of fiber optic cable between buildings and twisted pair copper cable for in-building conductivity. Service and infrastructure are available to support a wide range of communication requirements such as voice, data, video, wireless, land mobile radio, aircraft communications, and security systems (USAF 2010b). At this time, the development is not expected to connect to any physical aspect of the base's communication system, although there would need to be radio capabilities for potential flight operations.

3.11 SOCIOECONOMIC RESOURCES

3.11.1 Definition of the Resources

Socioeconomic analyses generally include investigations of the prevailing population, income, employment, housing conditions, and community services of a community or region of influence (ROI). The socioeconomic conditions of a community or ROI could be affected by changes in the rate of population growth, changes in the demographic characteristics, and changes in economic activity (e.g., employment, income, industrial and commercial growth) within the community or ROI caused by the implementation of an action.

3.11.2 Existing Conditions

3.11.2.1 Population

GFAFB lies entirely within Grand Forks County, adjacent to the City of Emerado, and within the Grand Forks, ND-Minnesota (MN) Metropolitan Statistical Area (MSA)². The base occupies an area of approximately 5,151 ac and is centrally located in Grand Forks County. For the purposes of this analysis, the ROI is defined as the census tracts surrounding and including GFAFB (114, 117, 119, and 120; **Figure 3-4**). In 2010, the population in the ROI was about 10,901, a decrease of 14.5 percent from 2000 (USCB 2000a, 2010a) (**Table 3-4**). This decrease may be due, in part, to the 2005 Base Realignment and Closure (BRAC) in which 1,434 military and 2,803 direct and indirect jobs in the region were lost between 2006 and 2011 (University of Illinois – DOD-OEA 2012). Conversely, between 2000 and 2010, the populations of North Dakota, Grand Forks County, and the Grand Forks, ND-MN MSA increased by 8.9, 1.1, and 1.0 percent respectively (USCB 2000a, 2000b, 2010a, 2010b).

In the ROI, the average annual per capita income from 2007 to 2011 was estimated to be \$25,306, less than that of the state, county or the MSA (USCB 2011a; **Table 3-5**); however, median household incomes in the ROI over the same time frame averaged \$57,756, more than \$10,000 higher than the median household income for the state, county, or the MSA.

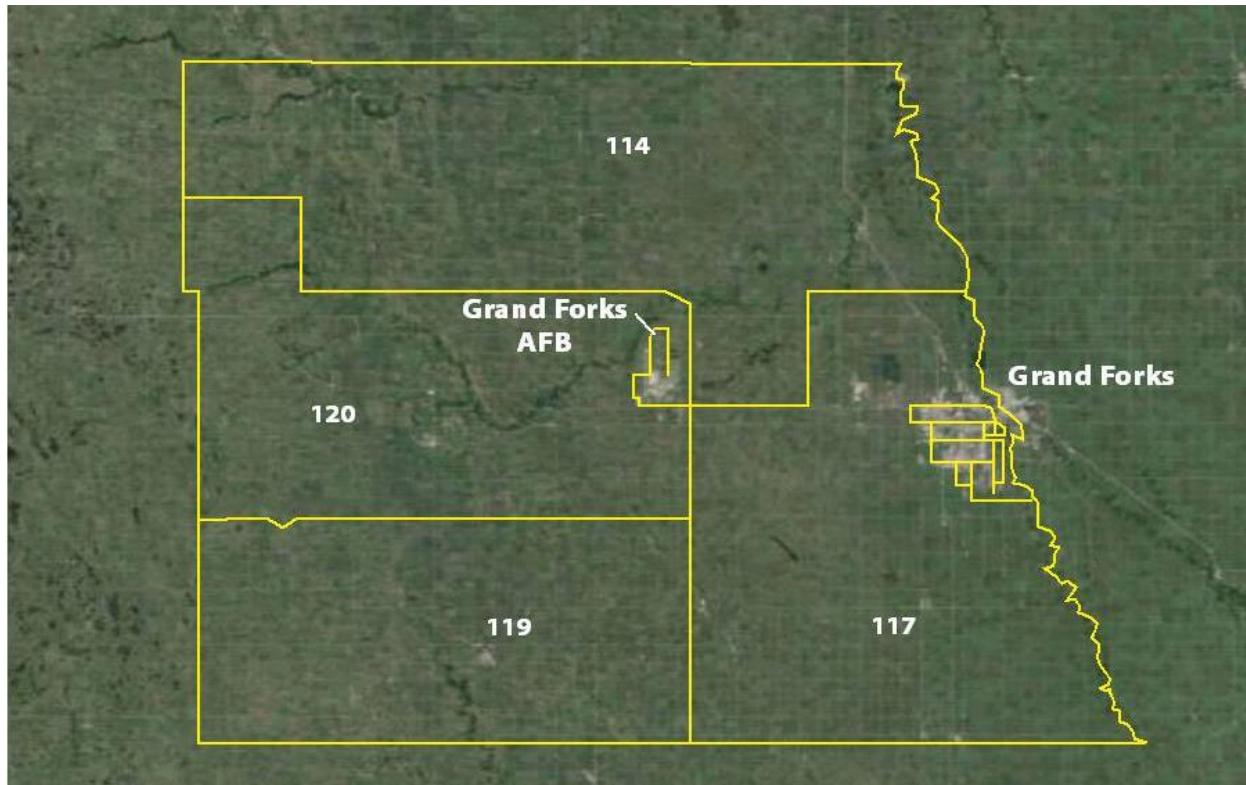


Figure 3-4. Census tracts within the Proposed Action Region of Influence (USCB 2009).

² The Grand Forks ND-MN MSA encompasses Grand Forks County, North Dakota and Polk County, Minnesota.

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Table 3-4. Population characteristics for North Dakota, Grand Forks County, the Grand Forks, North Dakota-Minnesota Metropolitan Statistical Area¹, and the Region of Influence for the Proposed Action for census years 2000 and 2010

Location	Census Year Population		Population Change
	2000	2010	
North Dakota	642,200	672,591	8.9%
Grand Forks County	66,109	66,861	1.1%
Grand Forks, ND-MN MSA	97,478	98,461	1.0%
ROI	15,527	13,268	-14.5%

ND = North Dakota; MN = Minnesota; MSA = Metropolitan Statistical Area; ROI = region of influence

Source: USCB 2000a, 2000b, 2010a, 2010b

(1) The Grand Forks, ND-MN MSA includes Grand Forks County, ND, and Polk County, MN.

3.11.2.2 Income and Employment

In 2000, the unemployment rate in the ROI was approximately 2.9 percent, nearly equal to that of the state and county; however, in 2010 the unemployment rate in the ROI decreased to 1.8 percent, lower than the state, county, or MSA (BLS 2013, USCB 2000c, 2010c; **Figure 3-5**). In April 2012, the unemployment rate in ND was 3.0 percent and it went up to 3.5 percent in April 2013. The Grand Forks MSA was 4.3 percent in both April 2012 and April 2013 (BLS 2013b). No 2012 or 2013 numbers were available for the ROI. The largest employment sector in all the evaluated areas is educational services, health care, and social assistance (USCB 2011a; **Table 3-5**). In the ROI, the next largest civilian employment sector is public administration, while it is retail trade for the state, county, and MSA. The proportion of the work force employed by the Armed Forces is larger in the ROI compared to that of the state, county, or MSA.

Table 3-5. Five-year estimate (2007-2011) of annual income for North Dakota, Grand Forks County, and the Grand Forks, North Dakota-Minnesota Metropolitan Statistical Area¹, and the Region of Influence surrounding the Proposed Action

	North Dakota	Grand Forks County	Grand Forks, ND-MN MSA ¹	ROI
Per Capita Income	\$27,305	\$25,807	\$25,317	\$25,306
Median Household Income	\$49,415	\$46,050	\$46,951	\$57,756

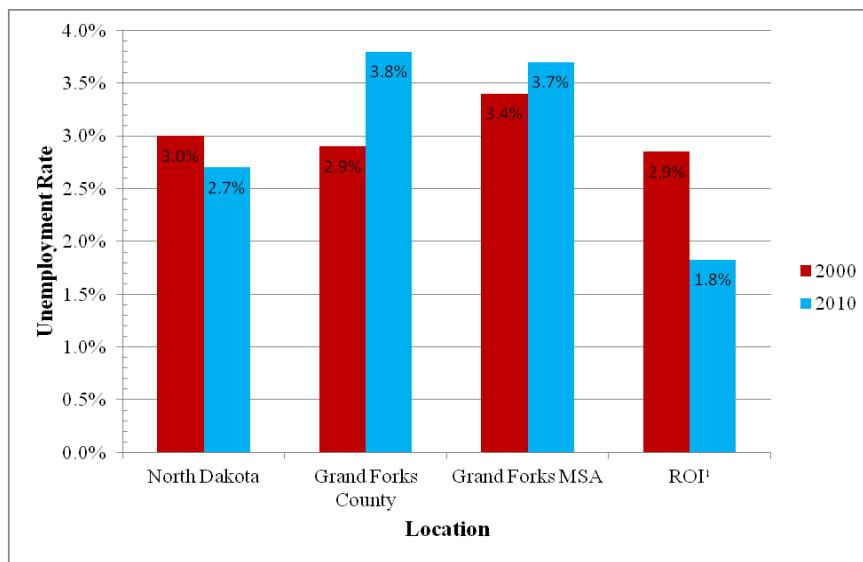
ND = North Dakota; MN = Minnesota; MSA = Metropolitan Statistical Area; ROI = region of influence

Source: USCB 2011a

(1) The Grand Forks, ND-MN MSA includes Grand Forks County, ND, and Polk County, MN.

3.11.2.3 Housing

With the exception of the ROI, housing growth in North Dakota, Grand Forks County, and the Grand Forks, ND-MN MSA has been positive (**Table 3-6**). Between 2000 and 2010, housing in the ROI decreased (**Table 3-7**), specifically in Census Tract 119 (GFAFB); which had a decrease in housing of 46.8 percent between 2000 and 2010. In 2000, there were 1,516 housing units available in Census Tract 119, this dropped to 807 in 2010, a decrease of 46.8 percent (USCB 2000d, 2010d). This decrease is mostly due to the 2005 BRAC at GFAFB that cut 1,434 military personnel on the base between 2006 and 2011 (University of Illinois – DOD-OEA 2012).



MSA = Metropolitan Statistical Area; ROI = region of influence

⁽¹⁾ Calculated percentages are the averages of the Census Tracts included in the ROI.

⁽²⁾ The Grand Forks, North Dakota-Minnesota Metropolitan Statistical Area includes Grand Forks County, North Dakota and Polk County, Minnesota.

Figure 3-5. Unemployment rates in 2000 and 2010 for North Dakota, Grand Forks County, Grand Forks, North Dakota-Minnesota Metropolitan Area², and the Region of Influence surrounding the Proposed Action (BLS 2013, USCB 2000c, 2010c).

The availability of housing in the ROI and county, as well as in the city of Grand Forks is currently in short supply (Jewett 2013a; City of Grand Forks Blue Ribbon Housing Commission [BRHC] 2012); however, the housing market is beginning to correct itself. According to the City Planner, several large subdivisions throughout the city are in planning or early construction phases. The number of apartments being constructed is at an all time high (Jewett 2013b).

3.11.2.4 Public Services

Education

There are nine public school districts in Grand Forks County. The Grand Forks Public School District is the largest district, with 12 elementary schools, 4 middle schools, and 2 high schools. The district serves more than 7,000 students in Grand Forks and the children residing on GFAFB. In the 2012-2013 school year, the district averaged a 19.24 student-to-teacher ratio (ND Department of Public Instruction 2013). The district has a present capacity of roughly 10,000 students (Thompson 2013).

Law Enforcement

Law enforcement for the proposed development would be provided by the Grand Forks County Sheriff's Department. The Department currently has 36 sworn deputies serving out of the main office in the City of Grand Forks, approximately 19 mi east of the project area, and another office in Larimore, approximately 13 mi west of the project area (Grand Forks County Sheriff Office 2013; Google Earth 2013).

Fire Protection

Fire protection for the proposed development would be provided by the Emerado Volunteer Fire Department about 3 mi from the site. The department has 22 volunteer fire fighters and another 8 non-fire fighter volunteers.

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Table 3-6. Five-year estimates (2007-2011) employment characteristics of North Dakota, Grand Forks County, and the Grand Forks, North Dakota-Minnesota Metropolitan Statistical Area¹, and the Region of Influence surrounding the Proposed Action

Employment Characteristics	North Dakota	Grand Forks County	Grand Forks, ND-MN MSA	ROI ²
Population 16 years and over in labor force	376,826	39,617	56,441	7,702
Percent in Armed Forces ³	1.6%	3.0%	2.2%	12.2%
Population and Percent by Occupation of Civilian Employed				
Civilian employed population	358,106	36,650	54,422	6,570
Agriculture, forestry, fishing and hunting, and mining	8.6%	3.3%	4.6%	9.6%
Construction	7.0%	6.1%	6.2%	8.1%
Manufacturing	7.4%	6.7%	7.9%	7.5%
Wholesale trade	3.3%	2.5%	2.8%	3.0%
Retail trade	12.1%	14.9%	14.3%	8.8%
Transportation and warehousing, and utilities	5.4%	4.0%	4.2%	5.0%
Information	1.7%	1.5%	1.6%	1.7%
Finance and insurance, and real estate and rental and leasing	6.0%	3.8%	3.8%	2.4%
Professional, scientific, and management, and administrative and waste management services	6.6%	6.2%	5.8%	4.6%
Educational services, and health care and social assistance	24.6%	32.5%	31.0%	28.1%
Arts, entertainment, recreation, and accommodation and food services	7.9%	9.9%	9.2%	5.8%
Other services, except public administration	4.6%	4.1%	4.4%	3.6%
Public administration	4.9%	4.4%	4.1%	11.9%

ND = North Dakota; MN = Minnesota; MSA = Metropolitan Statistical Area; ROI = region of influence

Source: USCB. 2011a

(1) The Grand Forks, ND-MN MSA includes Grand Forks County, North Dakota and Polk County, Minnesota.

(2) Calculated percentages are the averages of the Census Tracts included in the ROI.

(3) People on active duty with the United States Army, Air Force, Navy, Marine Corps, or Coast Guard.

Table 3-7. Number of available housing units in 2000 and 2010 and percent change in North Dakota, Grand Forks County, and the Grand Forks, North Dakota-Minnesota Metropolitan Statistical Area¹, and the Region of Influence surrounding the Proposed Action

Region	2000 (2005)	2010	Increase (Decrease)
North Dakota	289,677	317,498	9.6%
Grand Forks County	27,373	29,344	7.2%
ROI ³	5,948	5,468	(2.1%)
Grand Forks, ND-MN MSA	(43,233) ²	43,954	1.7%

ND = North Dakota; MN = Minnesota; MSA = Metropolitan Statistical Area; ROI = region of influence

Source: USCB 2000d; 2005; 2010d

(1) The Grand Forks, ND-MN MSA includes Grand Forks County, ND, and Polk County, MN.

(2) Housing data for MSAs not available until 2005.

(3) Calculated percentages are the averages of the Census Tracts included in the ROI.

Medical Facilities

The Altru Health Systems, a not-for-profit health care system, has 10 practice locations in Grand Forks County with 265 hospital beds (Altus 2013). The University of North Dakota School of Medicine and Health Sciences also has various facilities throughout the Grand Forks region.

3.12 ENVIRONMENTAL JUSTICE

3.12.1 *Definition of the Resource*

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to consider as a part of their action, any disproportionately highly adverse human health or environmental effects to minority and low-income populations. Agencies are required to ensure these potential effects are identified and addressed. According to the CEQ (1997), a minority population should be identified if it is composed of American Indian or Alaskan Native, Asian or Pacific Islander, Black (not of Hispanic origin), or Hispanic population groups that either exceed 50 percent of the population in an area, or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. A minority population can be defined by race, by ethnicity, or by a combination of the two distinct classifications. Race as defined by the USCB (2011b) includes:

- White – A person having origins in any of the original peoples of Europe, the Middle East, or North Africa;
- Black or African American – A person having origins in any of the Black racial groups of Africa;
- American Indian or Alaska Native – A person having origins in any of the original peoples of North and South America (including Central America) and who maintain tribal affiliation or community attachment;
- Asian – A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, or the Philippine Islands;
- Native Hawaiian and Other Pacific Islanders – A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands; and
- Some Other Race – Those not included in the White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander race categories, and also includes multiracial, mixed, interracial, or a Hispanic or Latino subgroup (e.g., Mexican, Puerto Rican, Cuban, or Spanish).

The USCB defines ethnicity as either being of Hispanic origin or not being of Hispanic origin. Hispanic origin is defined as “a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race” (USCB 2011b).

Each year the USCB defines the national poverty thresholds, these are measured in terms of household income dependent upon the number of persons within the household (USCB 2013). In 2011, individuals earning \$11,945 or less and a family of four (two adults and two children) earning \$23,283 or less were classified as falling below the poverty threshold (USCB 2013). Census tracts in which at least 20 percent of the residents fall below the poverty threshold are classified as poverty areas and tracts where 40 percent are in poverty are classified as extreme poverty areas (USCB 2011d).

3.12.2 *Existing Conditions*

In 2010, the majority population in the State of North Dakota, Grand Forks County, the Grand Forks, ND-MN MSA, and the ROI, was classified as White (**Table 3-8**). The largest population of minorities within the state, county, MSA and ROI was classified as American Indian and Alaska Native comprising 5.4, 2.5, 2.1, and 1.1 percent of the overall population, respectively. Because the percentage of minority populations of these geographic areas was less than 50 percent, and there was not a minority population percentage in the affected area meaningfully greater than the minority population percentage in the

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general population, they were not classified as a minority population that must be identified. None of the census tracts within the ROI are classified as poverty areas or extreme poverty areas, and all census tracts are equal to or below state, county and MSA poverty levels (**Table 3-9**).

Table 3-8. Demographic makeup of North Dakota, Grand Forks County, the City of Grand Forks, and the Grand Forks, North Dakota – Minnesota Metropolitan Statistical Area¹, and the Region of Influence surrounding the Proposed Action for 2010

Demographic	North Dakota	Grand Forks County	Grand Forks, ND-MN MSA	ROI ²
Total Population	672,591	66,861	98,461	10,695
Percent Male	50.5	51.4	51.0	52.1
Percent Female	49.4	48.6	49.0	47.9
Percent White	90.0	90.3	91.3	96.3
Percent Black or African American	1.2	2.0	1.7	0.7
Percent American Indian and Alaska Native	5.4	2.5	2.1	1.1
Percent Asian	1.0	1.9	1.5	0.5
Percent Native Hawaiian and Other Pacific Islander	0.0	0.1	0.0	0.0
Percent Some Other Race	0.5	0.8	1.1	0.4
Percent Two or More Races	1.8	2.4	2.3	1.0
Percent Hispanic or Latino (of any race)	2.0	2.9	3.7	1.3

ND = North Dakota; MN = Minnesota; MSA = Metropolitan Statistical Area; ROI = region of influence

Source: USCB 2010e

(1) The Grand Forks Metropolitan Statistical Area includes Grand Forks County, ND, and Polk County, MN.

(2) Calculated percentages are the averages of the Census Tracts included in the ROI.

Table 3-9. Poverty status for North Dakota, Grand Forks County, and the Grand Forks, North Dakota-Minnesota Metropolitan Statistical Area¹, and the Region of Influence surrounding the Proposed Action for 2011

	North Dakota	Grand Forks County	Grand Forks, ND-MN MSA	ROI Census Tracts			
				114	117	119	120
Percent Individuals Below Poverty	12.3	16.7	15.2	11.2	5.3	3.5	8.9
Percent Families Below Poverty	7.3	7.2	7.4	8.5	1.9	3.0	7.0

ND = North Dakota; MN = Minnesota; MSA = Metropolitan Statistical Area; ROI = region of influence

Source: USCB 2011a

(1) The Grand Forks, ND-MN MSA includes Grand Forks County, ND, and Polk County, MN.

3.13 OCCUPATIONAL HEALTH AND SAFETY

3.13.1 *Definition of the Resource*

Title 40 CFR 989.27 requires that the EIAP for a proposed action assess direct and indirect impacts of proposed actions on the safety and health of Air Force employees and others at a work site. The EIAP document does not need to specify compliance procedures; however, the EIAP documents should discuss impacts that require a change in work practices to achieve an adequate level of health and safety.

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Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of extremely noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

3.13.2 *Existing Conditions*

Numerous federal and state laws and regulations, as well as DOD and AFIs and guidance manuals govern safety operations at GFAFB. No Air Force employees work in the proposed development area except for the periodic security patrol or the occasional use of the Alpha Ramp for training exercises. In addition, the GFAFB Natural Resource Manager must enter the open space area to monitor and track the health of the ecosystems of the base.

Because of community interest and the potential threat of deer to the airfield, a bow-hunting program at GFAFB has been developed. The open areas of the lease area (not on the Alpha Ramp) are included in the areas where bow hunting is permissible. Due to base requirements necessary to ensure safety and military security, only active duty military and dependents, retired military and dependents, and DOD civilians are eligible to apply for permits to hunt in the designated areas. Each hunter must notify security forces prior to entering the field to hunt in their designated area.

As of January 2013, there are no Explosive Quantity Distance Arcs around the Alpha Ramp or any location southwest of the flight line. According to the Deputy Fire Chief MSgt Jason P. Barnard, there have been no aircraft fire incidents or accidents in the past 10 years.

4.0 ENVIRONMENTAL CONSEQUENCES

The environmental analysis of the proposed business park development that follows uses two conceptual site layout plans and mapping to allow for a baseline of environmental impact analysis in this EA that will facilitate and reduce the time for specific design plan reviews stemming from the incremental development phases over the life of the entire business park project. If during the course of specific design plan reviews, significant new circumstances arise relevant to the environmental concerns of the proposed siting and the proposed action changes enough to be outside the coverage of the present EA analysis and findings, then that design plan would no longer be covered by this EA. An additional EIAP must be undertaken, which might result in the need for further documentation, such as a supplemental EA; however, the design plan undergoing analysis would not affect the other development projects within the business park to the extent they remain within the scope of this EA.

To facilitate the discussion of potential impacts from Alternatives 1 and 2, the layout of the proposed business park and wetland features identified during the field surveys in June and July 2013 are presented on **Figures 4-1 and 4-2**. **Figures 4-1 and 4-2** are the same as **Figures 2-1 and 2-4**, provided again for the ease of comparison. These figures are found in the Wetland Impact sections of each alternative.

4.1 AIR QUALITY

Impacts to air quality would be considered significant if project emissions:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected area's emissions inventory

4.1.1 No Action Alternative

Under the no action alternative, there would be no emissions from construction or operation of the business park and no emissions from additional flight operations at GFAFB.

4.1.2 Alternative 1—Initial Layout

Alternative 1 includes construction of the proposed business park, potential demolition of the Alpha Ramp wall and perimeter road, operation of the business park (building heating and cooling and commuting), and potential flight operations. Each of these components would have an effect on air quality. Although parts of the Alpha Ramp wall and Perimeter Road may be left in place rather than demolished, the demolition of these features is included in the assessment of air quality impacts to represent the worst-case.

4.1.2.1 Construction and Demolition

The proposed construction would result in minor increases in fugitive dust (PM_{10}) from disturbance to soils and increased combustion emissions (VOCs, carbon monoxide [CO], sulfur dioxide [SO_2], and nitrogen oxide [NO_x]) from the use of construction equipment. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity. Emissions from activities associated with site clearing, grading, and from vehicular traffic moving over the disturbed site would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and prevailing weather conditions. The California Air Resources Board (CARB) has developed an emissions factor for unmitigated fugitive dust conditions of 0.22 tons (T) of PM_{10} per ac per month (CARB 2002). Watering exposed soil at the beginning and end of each day decreases the amount of fugitive dust released into the atmosphere from construction operations and trucks driving on unpaved surfaces by as much as 50 percent (SMAQMD 2004). Other best management practices for fugitive dust control include:

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- Stabilizing open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Installing wind fencing and phase grading operations where appropriate, and operating water trucks for stabilization of surfaces under windy conditions.
- When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

The combustion emissions generated during both the construction and the demolition processes were estimated using USEPA emission factors for construction equipment and an estimate of what equipment would be used and for how long. Due to the lack of details about the construction and demolition processes at this time, estimates of construction equipment usage were derived from construction estimating standards (SMAQMD 2004). Emission factors were estimated in pounds per day, which were multiplied by an estimate of hours per day the equipment would be working and the number of days the equipment would be on site. These emissions were then compared to 2008 Grand Forks County emissions. The emissions associated with construction and demolition activities would be negligible and would not affect the local air quality.

These calculations are presented in **Table 4-1** with details in **Appendix G**.

**Table 4-1. Combustion emission totals for Alternative 1 compared to
Grand Forks County and North Dakota**

	NO _x (T)	VOC (T)	CO (T)	PM ₁₀ (T) ¹
Grand Forks County ²	2,929	2,411	15,015	5,397
North Dakota ²	145,229	39,517	235,059	122,005
Total construction and demolition emissions ³	45.46	8.38	70.04	26.05
Project emissions as % of County annual emissions	1.55	0.35	0.47	0.48

NO_x = nitrogen oxide; T = tons; VOC = volatile organic compound; CO = carbon monoxide; PM₁₀ = particulate matter less than or equal to 10 micrometers in diameter; % = percent

⁽¹⁾ Emissions factors for the sources were not available for PM_{2.5}; therefore, PM emissions are for PM₁₀ only.

⁽²⁾ Source: USEPA 2013b

⁽³⁾ Emissions include fugitive dust emissions with combustion PM₁₀.

The combustion of fossil fuels by construction equipment and construction worker's vehicles during commutes contribute to an increase of GHG. Construction equipment emits approximately 22.4 lb of carbon dioxide (CO₂) per gallon of diesel and commuter vehicles emit an average of 19.6 lb of CO₂ per gallon of gasoline (DOE-EIA 2006). The South Coast Air Quality Management District (SCAQMD) UREBIS9 model estimates construction worker vehicle miles traveled by multiplying the square footage of the office or industrial park by an emissions factor based on type of construction project (e.g., single family homes versus office or industrial park). This value is then multiplied by an emissions factor for CO₂ in pounds per mile to derive an estimate of pounds of CO₂ generated for an office or industrial park. For the 1.2 million ft² planned for Alternative 1, the total CO₂ generated would be about 25,200 T over the 10 to 20 years that construction would occur, or roughly 2,100 TPY.

The Department of Energy – Energy Information Administration (DOE-EIA) estimates that in 2010, gross CO₂ emissions in North Dakota were 52.5 million metric tons or 57.09 million tons (DOE-EIA 2005). Approximately 2,100 TPY of CO₂ were estimated to be emitted by the development construction, which is less than 0.0037 percent of the North Dakota statewide CO₂ emissions; therefore, the construction of Alternative 1 would have a negligible contribution towards the North Dakota statewide GHG emissions.

4.1.2.2 Business Park Operations

Emissions during business park operations would come from the external combustion sources within the heating and cooling system, back-up generators for emergency power, and any chemicals or devices used by the individual tenants. The emissions from external combustion units depend on a variety of factors including the size/type of the combustor, firing configuration, fuel type, control devices used, operating capacity, and whether the system is properly operated/maintained. The details of the heating and cooling systems are not known at this time; therefore, these emissions could not be calculated; however, the County plans to incorporate energy and water conservation initiatives into all facilities and activities, where practicable, or as required by local or state regulations or guidelines. It also intends to seek LEED Silver certification for the development; therefore, the emissions from the heating and cooling of the buildings would be a minor impact to the surrounding air quality.

GFAFB has roughly 35 diesel engine-driven emergency generators ranging from approximately 20 to 1,200 brake horsepower (bhp)³ listed on their Title V air permit. These emission sources are classified as “insignificant” due to the operating hours and the limits of insignificance provided in NDAC 13-15-14-06(4)(c), which are roughly 2 TPY for the priority pollutants. Even at full build-out the proposed development would be unlikely to need as many of the emergency generators as GFAFB (fewer buildings); therefore, the impact of these generators on air quality would be minor.

4.1.2.3 Flight Operations

For the GFAFB RPA Beddown EIS, emissions from both the Global Hawk and the Predator were calculated on a per sortie basis. Global Hawks were assumed to conduct one 12- to 15-hour sortie per day, and Predators were assumed to conduct two 8-hour sorties per day. Emissions were calculated for the length of time that the RPA would be below 6,000-ft altitude, because above that height, the emissions would be above the mixing zone and would be insignificant in areas where the air quality is in attainment for all priority pollutants (USAF 2010a). The emissions per sortie for both the Global Hawk and the Predator are presented in **Table 4-2**. For this analysis, the Global Hawk and Predator are being used as examples of the types of UAS that a tenant could request approval to fly. It is more likely that all 100 sorties per month (the maximum assumed for either alternative) would be of one type or the other, not split 50-50; therefore, the annual emissions calculated assuming that all 100 sorties per month are Global Hawks and assuming that all 100 sorties per month are Predators are also provided in **Table 4-2**.

Table 4-2. Per sortie and annual emissions from flight operations

Emissions	CO	NO_x	SO₂	PM	VOC
Global Hawk per sortie (lb)	0.319	1.851	0.188	0.045	0.060
Predator per sortie (lb)	0.418	0.164	0.007	0.007	0.300
Annual Global Hawk @ 100 sorties/month (lb/Y)	382.48	2,221.69	225.84	54.29	72.19
Global Hawk TPY	0.191	1.111	0.113	0.027	0.036
Annual Predator @ 100 sorties/month (lb/Y)	501.23	197.06	8.57	8.57	359.86
Predator TPY	0.251	0.099	0.004	0.004	0.180

Ib = pound(s); Ib/Y = pound(s) per year, TPY = ton(s) per year

As seen in **Table 4-2**, all priority pollutants would be generated at less than 2 TPY, and would be considered insignificant emission sources per NDAC 13-15-14-06(4)(c).

³ Brake horsepower (bhp) is the measure of an engine's horsepower before the loss in power caused by the gearbox, alternator, differential, water pump, and other auxiliary components such as power steering pump, muffled exhaust system, etc.

4.1.3 Alternative 2—Revised Layout

Alternative 2 would also consist of construction of the proposed business park, potential demolition of the Alpha Ramp wall and perimeter road, operation of the business park (building heating and cooling and commuting), and potential flight operations. Since the overall footprint of the construction would be similar to the layout in Alternative 1, the difference in construction emissions would be negligible. As with Alternative 1, the need for emergency generators would be much less than the base at large, so the impact on air quality would be minor. There would be no difference in flight operations between the two alternatives.

4.2 WATER RESOURCES

A potential impact on water resources would be significant if it were to result in one of the following scenarios:

- Reduce water availability to existing users or interfere with the supply
- Create or contribute to overdraft of groundwater basins or exceed safe annual yield of water supply sources
- Adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations that have been adopted to protect or manage water resources of an area.

4.2.1 No Action Alternative

Under the no action alternative, the proposed development would not occur; therefore, there would be no disturbance of water resources in the project area.

4.2.2 Alternative 1—Original Layout

Alternative 1 has the potential to affect water resources in three ways: the runoff of sediment or other contaminants to Turtle River, the reduction in the acreage of wetlands on GFAFB, and/or the increase in impervious surfaces affecting stormwater management.

4.2.2.1 Water Quality

Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris, and chemicals and transport these to a nearby drainage system or directly to a river, lake, or coastal water. Polluted stormwater runoff can harm or kill fish and other wildlife. Sedimentation can destroy aquatic habitat, and high volumes of runoff can cause stream bank erosion.

Since Alternative 1 would cover more than 1 ac in area, coverage under ND's NPDES General Permit for Stormwater Discharge Associated with Construction Activities would need to be obtained by the County. The Air Force would need to file a Notice of Intent with NDDH and the County and its developers would prepare a site-specific SWPPP that includes BMPs to reduce the potential for soil erosion and prevent contaminant-laden stormwater from leaving the construction site. Site-specific BMPs would be developed during the construction design phase, but the following general BMPs would be used to reduce the potential for adverse impacts on water quality:

- Minimize soil exposure by clearing only the land needed for the current phase of construction.
- Control soil erosion by covering exposed soils, if practicable, whenever the construction area is idle.

- Install perimeter controls and sediment trapping devices, such as silt fences, fiber logs, small sediment basins, and vegetative buffer strips.
- Use inlet protection, such as berms or geo-fabrics, where runoff would enter the major drainage ways.
- Avoid tracking and depositing sediment off site by removing sediment from construction vehicles before they leave the site.
- Prevent soil contamination by fuels or other chemicals by using general construction site waste management (good housekeeping), preparing and adopting a spill prevention and control plan, and establishing appropriate vehicle maintenance and washing areas.

In addition, the following guidelines for minimizing degradation to waterways during construction were provided by the NDDH during the public comment period, and constitute the minimum requirements of the Department:

- Soils. Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.
- Surface Waters. All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from the NDDH.
- Fill Material. Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The NDDH may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.

The use of these BMPs would make any degradation of water quality from Alternative 1 minor and not significant.

4.2.2.2 Wetland Loss

Wetland delineation of the 217-ac project area identified 14.069 ac of jurisdictional and 9.726 ac of non-jurisdictional (isolated) wetlands. Laying the site plan for Alternative 1 over the wetlands shows that with that layout, 4.674 ac of jurisdictional and 5.556 ac of isolated wetlands would be permanently impacted (**Figure 4-1**). These are wetlands that fall under the proposed building or other paved area outlines. In addition, a 15-foot off-set line was drawn around the buildings and paved areas and the area of jurisdictional and isolated wetlands between the building and paved area outlines and the off-set line was calculated as the area needed for construction of the development features. The figures used to note these impact areas and the individual size of the impact areas are presented in **Appendix H**. Construction impacts of 1.386 ac of jurisdictional and 2.807 ac of isolated wetlands would be temporary, and would be re-established when construction in that area was permitted to the extent allowed by the USACE and Air Force. Six culverts would need to be placed to allow for roads to cross over wetlands or drainage channels. Although most utility lines in the development will be designed to follow the roadways, if the final design affects additional wetlands, the extra temporary disturbance would be included in the impact acreage and restored following Air Force and USACE guidance or requirements.

Initially, the County's plan for reducing the impact to wetlands was to "move" them or construct new wetlands within the development to serve as both wetland mitigation and stormwater management. The layout for Alternative 1 included a 7.85-ac retention basin in the far northwest corner of the project area and more wetland/retention areas between the Alpha Ramp wall and the access road to the west of the wall. The linear wetland that cuts through the parcel providing drainage from south to north would remain much as it is with the added culverts of two road crossings. To disturb and replace 4.674 ac of jurisdictional wetlands would require that the County and/or its representatives to apply for a permit from the USACE under Section 404 of the CWA. The Air Force would assist as necessary and allowed. As a condition of that permit, the USACE would require the County to first try to avoid or reduce the loss of wetlands to the maximum extent practicable (see Alternative 2) and enhance existing wetlands within the project area using a one-to-one replacement ratio.

In addition to Section 404, the County would need to ensure "no net loss of wetlands" as required by EO 11990 and DODI 4715.03. These policies not only apply to jurisdictional wetlands, but also to the isolated wetlands. To the extent practicable and allowed or approved by the USACE and the Air Force, the County would mitigate for the impact on isolated wetlands also by enhancing existing wetlands within the project area using a one-to-one replacement ratio. As long as the conditions of the Section 404 permit and the requirements of EO 11990 are met by the County in the final construction plans, Alternative 1 would have adverse, but not significant, impacts on wetlands in the project area.

4.2.2.3 Stormwater Management

A large portion of Alternative 1 would be buildings or pavement that would result in an increase of impervious surfaces. The creation of impervious surfaces has the potential to decrease stormwater quality and increase stormwater quantity, particularly during large rain events. Overland storm flows pick up contaminants and carry them into receiving water bodies. Large areas of impervious pavement that once were pervious soils increase the speed at which stormwater enters channels; if a drainage channel cannot accommodate the increased volume of stormwater, areas upstream or downstream can flood.

The Alpha Ramp covers 1.219 million ft² (28 ac), not all of which is within the 217 ac project area. Following full build-out, there would be roughly 3.103 million ft² (72 ac) of buildings, parking lots, and roads. Per the layout for Alternative 1 on **Figure 2-1**, 68,824 ft² (1.6 ac) of the proposed development is existing pavement on the Alpha Ramp; therefore, the impervious surfaces would increase by roughly 3.035 million ft² (70 ac) or one and one-half times the existing pavement of the Alpha Ramp.

As discussed in Section 3.2.1, Section 438 of the EISA requires that natural hydrology be maintained or restored to the maximum extent technically feasible. Predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology would be calculated and site design would incorporate stormwater retention and reuse technologies to the maximum extent technically feasible. Post-construction analyses would be conducted to evaluate the effectiveness of the as-built stormwater reduction features. The development would also need to satisfy Grand Forks County Zoning Resolution Storm Water Management requirements, which require that the site be designed to accommodate the 100-year/24-hour storm, or in this case approximately 5 ac-ft of storage. With these elements to the plan of Alternative 1, there would be no adverse affects regarding stormwater management.

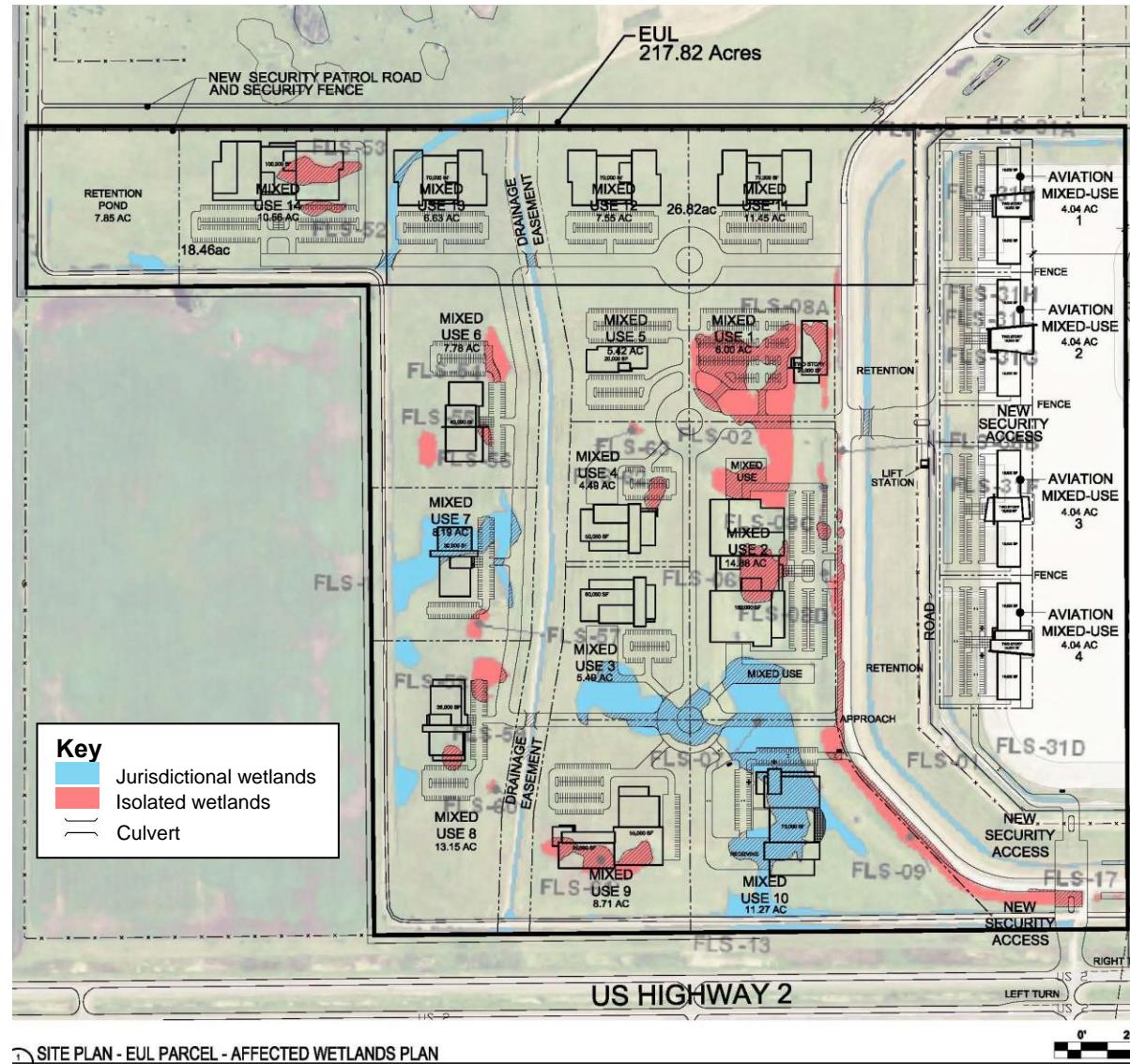


Figure 4-1. Wetlands affected by Alternative 1.

Note: The label "retention" indicates where a retention pond could be located. During the final design process, the size and specific location would be determined with retention ponds fully segregated from the wetlands.

4.2.3 Alternative 2—Revised Layout

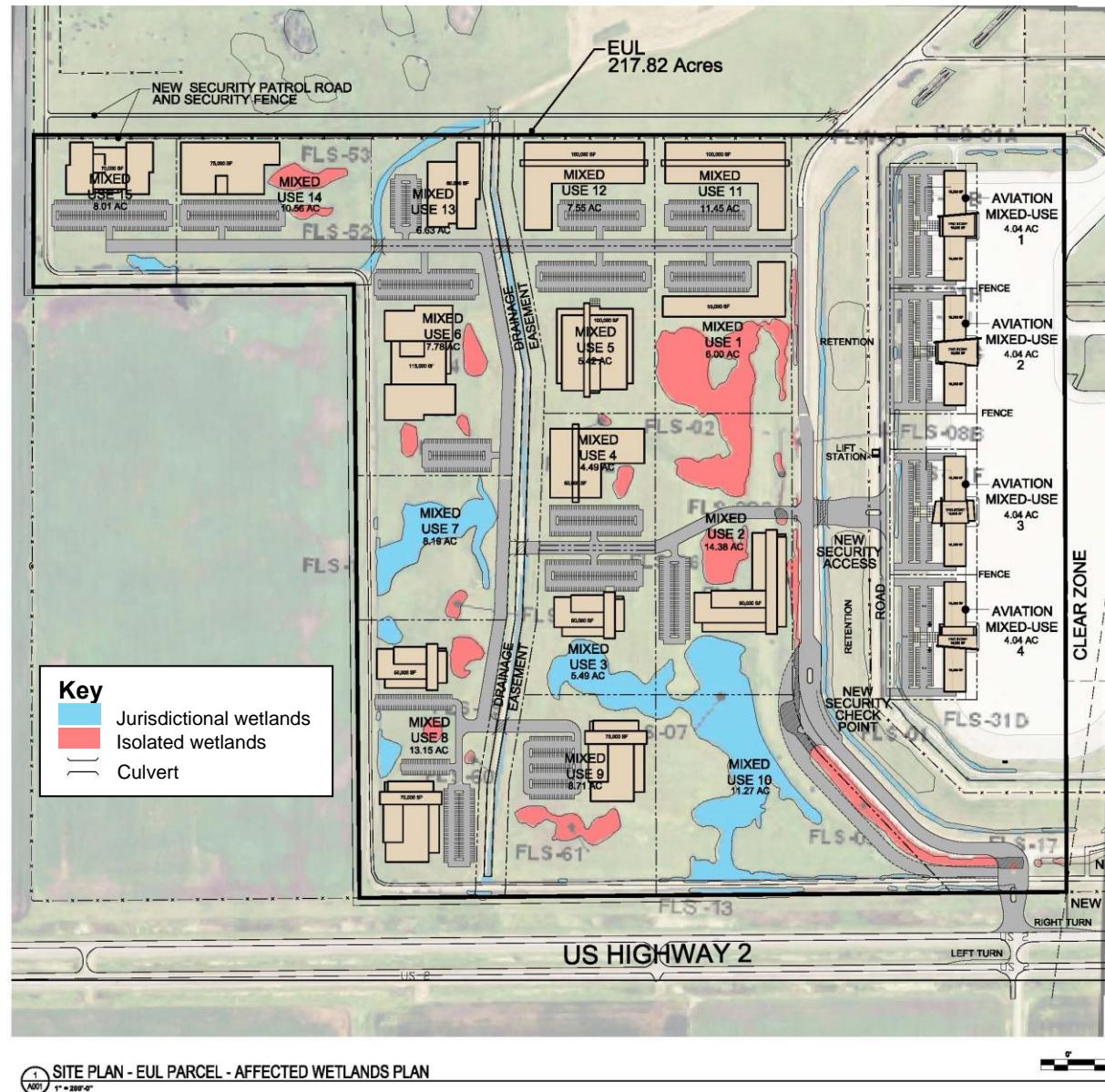
Due to the acreage of wetlands, both jurisdictional and isolated, that would be impacted by the original proposed layout (Alternative 1), the County revised the conceptual layout to avoid and minimize the loss of wetlands to the maximum extent practicable, while maintaining a viable business development plan. As shown in **Table 4-3** and on **Figure 4-2**, Alternative 2 substantially reduces the amount of wetlands that would be disturbed by the business development.

Table 4-3. Impacts on wetlands for both Alternative 1 and Alternative 2

	Alternative 1	Alternative 2	Reduction of Impact
Permanent Impacts on Wetlands			
Permanent impacts on jurisdictional wetlands (excluding culverts)	4.430 acres	0.0346 acres	99.2%
Permanent impacts on jurisdictional wetlands from culvert placement	0.2445 acres	0.2789 acres	-14.1% (gain)
Permanent impacts on isolated wetlands	5.556 acres	0.4964 acres	91.1%
Total permanent impacts on wetlands (jurisdictional, isolated, and culverts)	10.23 acres	0.8109 acres	91.3%
Temporary Impacts on Wetlands			
Temporary impacts on jurisdictional wetlands	1.152 acres	0.4695 acres	59.2%
Temporary impacts on jurisdictional wetlands from culvert placement	0.2340 acres	0.2685 acres	-14.7% (gain)
Temporary impacts on isolated wetlands	2.807 acres	0.8092 acres	71.2%
Total temporary impacts on wetlands (jurisdictional, isolated, and culverts)	4.194 acres	1.547 acres	63.1%
Number of culverts	6	7	+1

4.2.3.1 Wetland Loss

Laying the revised conceptual site plan for Alternative 2 over the wetlands shows that 0.314 ac of jurisdictional and 0.496 ac of isolated wetlands would be permanently impacted by the revised layout. The figures used to note these impact areas and the individual size of the impact areas are presented in **Appendix H**. In addition, 0.738 ac of jurisdictional wetlands and 0.803 ac of isolated wetlands would be temporarily disturbed during construction of the development, but would be re-established as construction in the area was completed. As discussed in Section 4.2.2.2, the permanent impacts were calculated by measuring the wetland areas that fall under the proposed buildings, other paved area outlines, or culverts. The temporary wetland impacts were calculated by summing the wetland areas between the permanent loss areas and a 15-foot off-set line drawn around them. Seven culverts would need to be placed to allow for roads to cross over wetlands or drainage channels. Because the layout plan submitted for Alternative 2 is conceptual and subject to change, the Air Force is evaluating the impacts of up to 1 acre of jurisdictional wetland permanent impact and 1 acre of isolated wetland permanent impact, and the potential temporary construction impacts around the permanent structures.



As with Alternative 1, the County would need to apply for a permit from the USACE under Section 404 of the CWA for Alternative 2. To disturb and mitigate for an acre of jurisdictional wetlands and the other wetland impacts indicated, the County or its representatives would need to apply for an individual permit with the Air Force's assistance, if necessary and allowed. The County would be responsible for mitigating for the remaining loss of wetlands as stipulated by the USACE permit, which would likely stipulate enhancing existing wetlands within the project area using a one-to-one replacement ratio.

As noted in Alternative 1, the Air Force would continue to have oversight and would be responsible to ensure that the County and its representatives' development activities in wetlands results in "no net loss of wetlands" as required by EO 11990 and DODI 4715.03, which apply to both the jurisdictional and isolated wetlands. To the extent practicable and allowed or approved by the USACE and the Air Force, the County would mitigate for the impact on isolated wetlands also by enhancing existing wetlands within the project area using a one-to-one replacement ratio. As long as the conditions of the Section 404 permit and the requirements of EO 11990 are met by the County in the final construction plans, Alternative 2 would have adverse but substantially less impacts on wetlands in the project area than Alternative 1.

4.2.3.2 Stormwater Management

The construction of Alternative 2 would employ the BMPs and follow the requirements of ND's NPDES General Permit for Stormwater Discharge Associated with Construction Activities as mentioned under Alternative 1. Alternative 2 would also manage stormwater runoff to hold back the quantity of runoff from the 100-year/24-hour storm, or approximately 5 ac-ft of water. The impacts of Alternative 2 on water quality and stormwater management would be the same as with Alternative 1, which is minor and not significant or none, respectively.

4.3 BIOLOGICAL RESOURCES

Impacts on biological resources would be significant if the alternative resulted in:

- A significant adverse effect to any federally, state, or locally regulated or regionally sensitive species or valuable natural resource (sensitive plant/animal community);
- A significant adverse effect to endangered, threatened or candidate species or if it adversely modified or destroyed their critical habitat under ESA; or
- Significant adverse effects on birds protected under GFAFB's comprehensive "Species of Concern" list.

4.3.1 No Action Alternative

Under the no action alternative, the proposed development would not occur; therefore, there would be no disturbance of biological resources in the project area. Parts of the area would continue to be periodically cut for hay. This area would also remain available for potential additional prairie restoration projects as recommended in the 2011 INRMP (GFAFB 2011).

4.3.2 Alternative 1—Initial Layout

4.3.2.1 Vegetation

Implementing Alternative 1 would not result in significant impacts to vegetation at GFAFB. Construction of the mixed-use business park would occur on 217 ac in the southwest corner of the base; which contains approximately 163 ac or about 10 percent of the roughly 1,550 ac of grassland or hay fields on GFAFB (calculated by acreages provided in the Species of Concern Management Plan [North Wind 2011]). This area is primarily comprised of non-native cool season grasses and hay fields.

Standard construction BMPs (e.g., hay bales/silt fences along the edges of the disturbed areas, drip pans under construction vehicles, hazardous waste/spill response plan, daily collection of human trash, port-a-

potties) would be used to protect adjacent habitat from degradation and contamination. The unused portions of grasslands would be maintained as recommended in the INRMP to control noxious weeds and promote native grassland species. Implementation of Alternative 1 would have an adverse, but not significant effect on vegetation communities in the project area.

4.3.2.2 Wildlife

There are several species that use the project area for forage, cover, breeding, and nesting. The 2009 Biological Survey identified 49 bird species, 2 mammal species, and 1 reptile species in the southwest corner of GFAFB either within or in close proximity to the proposed project area. Clearing and developing 217 ac at the site would displace any wildlife currently inhabiting this area or exclude it from future use by transitory or migratory species. Some of the wildlife would be able to relocate to adjacent property, while those transitory and migratory species may be able to locate other areas for foraging, breeding, and nesting; moreover, a build out schedule occurring over a 10- to 20-year timeframe would be less disruptive to wildlife communities than the entire proposed project acreage being developed over a short period of time. The impacts of Alternative 1 on wildlife would be adverse, but not significant.

4.3.2.3 Protected Species

Based on the 2011 INRMP, no threatened or endangered species have been documented on GFAFB. As such, there would be no negative impacts to threatened or endangered species from the implementation of Alternative 1.

As mentioned in Section 3.3.2.3, bald eagles have been observed at GFAFB harassing waterfowl near the sewage lagoons, feeding on road kill in the area, and hunting in the Turtle River riparian area. Golden eagles have been observed migrating through the area during the spring time. Prior to any construction in the project area, a survey would be conducted to determine if any bald eagle nests exist within line-of-sight of the development. These surveys would be scheduled to take place before leaf-out so that nests are visible, which is usually between March 1 and May 15.

For GFAFB's INRMP, the list of species present on the base was compared to the various lists of species of concern created by the conservation programs mentioned in Section 3.3.1 and compiled to create a comprehensive GFAFB "Species of Concern" list to document species observed and recorded on GFAFB. From that list, 72 species (64 birds, 4 plants, 2 mammals, and 2 amphibians) have been documented on GFAFB (North Wind 2011). The list from the INRMP is included in **Appendix E**. Further sorting this list by those bird species of high priority concern and those that have been recorded on the project's 217 ac, produced a list of 24 species of concern that could potentially be found in the habitat on the project area. Of these species, seven have been sighted regularly in the project area during breeding bird surveys: bobolink (*Dolichonyx oryzivorus*), northern harrier (*Circus cyaneus*), sedge wren (*Cistothorus platensis*), sharp-tailed grouse (*Tympanuchus phasianellus*), short-eared owl (*Asio flammeus*), Swainson's hawk (*Buteo swainsoni*), and upland sandpiper (*Bartramia longicauda*). In addition, the 2009 Biological Survey identified a sharp-tailed grouse (*Tympanuchus phasianellus*) lek (male breeding display area) and nests within the proposed project area (GFAFB 2010). All of these have been ranked as high priority for conservation management in the Species of Concern Management Plan (North Wind 2011).

Four plant species categorized as ND Species of Concern have been documented on GFAFB (2011), of which white lady's slipper (*Cypripedium candidum*) and lesser yellow lady's slipper have been documented in the grassland/wetland area west of the flightline, including one patch within the northwest corner of the project area (North Wind 2011). To reduce the potential for impacts on the populations of lady's slippers orchids in the northwest corner of the project area, the County would conduct a survey for these sensitive plants prior to developing specific site plans for development of the northwestern-most parcel of the project area and attempt to avoid impacts on the plants to the maximum extent practicable. In addition, herbicide application would not be conducted in areas where white or yellow lady's slipper occurs.

Development of the proposed project area would decrease the amount of unimproved habitat on GFAFB that would be available for some North Dakota conservation species. The principal reason for the decline of some grassland bird species is habitat loss. The amount of land that would be developed is small in comparison to the amount of grassland habitat in the state or even on the installation; as mentioned in Section 4.3.2.1, the project area as a whole contains less than 10 percent of the grassland or hay fields of the base. Grassland habitat would remain undisturbed until construction is ready to start in that specific area. Only the amount of area needed for construction within a phase would be disturbed in that phase. Once construction is completed on a particular building/lot, available areas will be reseeded with native grasses to the extent practicable. Potential impacts to ground-nesting birds would be further reduced by timing development to occur outside of the primary nesting season. The 2011 INRMP suggests that waiting until July 15 or later to mow or hay the prairie habitat would allow most grassland nesting birds enough time to fledge their young. Similarly, the impacts of the development construction activities involving major ground disturbance within the grassland areas would potentially be delayed until after July 15. If construction needs to begin before July 15, a preconstruction survey would be conducted to determine if there are any migratory bird nests on the ground. If nests are located within the area to be disturbed, the USFWS would be consulted and the area would be avoided until the fledglings leave the nest.

By following the mitigation presented in this section and detailed in the Mitigation Plan presented in **Appendix C**, the impacts on protected species expected under Alternative 1 would be adverse, but not significant.

4.3.3 Alternative 2—Revised Layout

The reduced impact on wetlands under Alternative 2 would also reduce the impact on vegetation and habitat. The proposed layout for Alternative 2 reduces the acreage of wetlands lost from 10.23 ac to 0.811 ac. The area of roads and parking areas (non-building footprint) would be reduced from approximately 1.88 million ft² to 1.6 million ft². The overall site would still be 217 ac; however, there would be additional space for bird foraging and nesting within the site. The same mitigation measures that would be followed for Alternative 1 would also be followed for Alternative 2; therefore, the impacts of Alternative 2 on biological resources would be adverse, but not significant.

4.4 CULTURAL RESOURCES

Significant impacts to cultural properties would occur only if the alternatives would adversely affect historic properties. An adverse effect is an undertaking that diminishes the integrity of a property's location, design, setting, materials, workmanship, feeling, or association or in other words, damages the qualities of the historic property that make it eligible for listing in the NRHP. An adverse effect can occur through the destruction or alteration of the property, isolation from or alteration of the environment, introduction of intrusive elements (visual, audible, or atmospheric), neglect, and the transfer, lease or sale of the property (Advisory Council on Historic Preservation and GSA Interagency Training Center 1995).

The nature and potential significance of cultural resources in the potentially affected areas were identified by considering the following definition: Historic properties, under 36 CFR Part 800, are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP." For the purpose of these regulations, this term includes artifacts, records, and remains that are related to and located within such properties. The term "eligible for inclusion in the National Register" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet NRHP-listing criteria.

4.4.1 No Action Alternative

For the no action alternative, current conditions would not change and no impact on cultural resources would occur at GFAFB.

4.4.2 Alternative 1—Initial Layout

4.4.2.1 Archaeological Resources

No significant archaeological resources are present within the APE; therefore, the proposed action is not expected to encounter, impact, or have any effect on archaeological resources.

4.4.2.2 Traditional Cultural Properties

Although there is not any evidence of Native American sacred sites or other properties or resources of traditional religious and cultural importance within the APE for this proposed action, GFAFB corresponded with federally recognized tribes that are or may be affiliated with the area comprising the installation. GFAFB also corresponded and consulted with the SHPO, any authorized THPOs, and/or the assigned ACHP representative as needed or required to determine whether there are any areas or property of concern involving the proposed business development site. The 319 ABW Commander and the CRM at GFAFB sent letters on 22 October 2013 notifying the Tribes and the THPO of the proposed project, the APE, prior surveys and findings, and inquiring whether the Tribes desired to engage in consultations pursuant to the NHPA, Section 106. Historically, on prior projects sited on GFAFB, the Tribes have not requested Section 106 consultations and consistently replied that adverse effects to historic properties and resources would not occur and the consultation process was not necessary; therefore by 20 November 2013, during which time further follow-up by GAFB occurred (telephone calls and/or emails) since the October letters, the CRM reported that only one tribe, the CRST, requested Section 106 consultations on the proposed action. The THPO for the CRST had expressed concern that past surveys and data had not fully considered whether there were any items or resources of cultural or religious significance to the tribe. The CRST was particularly concerned that appropriate responses should occur in the event any gravesites or human remains were found during pre-construction and actual construction activities. Subsequently the CRST requested the GFAFB visit the CRST for consultation purposes. The 319 ABW Vice Commander, CRM, Installation Support Team Cultural Resources, and AFCEC attended an onsite meeting on 05 December 2013 to open consultations, but due to a lack of obtaining Tribal quorum, were unable to accomplish that task. The 319 ABW Vice Commander followed up after the meeting by sending correspondence to the CRST on 20 December 2013 and invited them to visit the installation to view the APE. On 04 February 2014, the GFAFB sent a proposed MOU to the CRST to outline the purpose and need to engage in a base site visit allowing the CRST an opportunity to address their concerns. To preliminarily discuss the proposed MOU, the 319 ABW Vice Commander, the CRM and Air Force legal counsel participated in consultations through a teleconference on 19 February 2014 (due to Air Force travel budget constraints), with the CRST THPO and his invitees or representatives from the SRST, and the SWO. The SLT was invited by this group of Tribal Nations and agreed to participate later. The principal request by the Tribes was to access the APE on GFAFB to perform its own cultural resources survey and discuss inadvertent discoveries during pre-construction and construction activities of project development; thereafter, a MOU was drafted for the Tribes' review. Initial discussions had focused on a PA but were later changed to an MOU at the direction of the ACHP when the SHPO decided a PA was not necessary and only limited ACHP participation would be needed at this point. The 319 ABW evaluated the Tribes' review and comments of the draft and a Final MOU was prepared and sent to the Tribes for their final review and final signatures. The Final MOU between GFAFB and the Tribes is found in **Appendix B** of this EA.

4.4.2.3 Historic Resources (buildings and structures)

Alternative 1 is expected to have potentially minimal impact to historic resources. In the event any such resources are discovered during pre-construction and construction activities, these activities would be stopped until an appropriate identification of the discovery is determined. The Grand Forks County developer or representatives will be instructed to immediately notify the GFAFB EUL Project Coordinator and/or the CRM of the discovery. The GFAFB CRM would proceed with appropriate notifications required by law, Air Force guidance, or the MOU for appropriate determinations of the discoveries; however, it is expected that there will not be any historic resources uncovered within the APE; therefore, there would be no effect on cultural resources.

4.4.3 Alternative 2—Revised Layout

As with Alternative 1, Alternative 2 is also expected to have potentially minimal impact to cultural resources. The same responses discussed with Alternative 1 should occur.

4.5 HAZARDOUS MATERIALS AND HAZARDOUS WASTES

Impacts from hazardous materials or hazardous wastes would be significant if the alternative:

- Generates, uses, or stores hazardous materials or hazardous wastes in violation of federal or state regulations
- Exposes construction workers to increased health risks from working in existing contamination without proper training and equipment.

4.5.1 No Action Alternative

Under the no action alternative, the proposed development would not occur; therefore, there would be no change in hazardous materials usage or hazardous wastes generation.

4.5.2 Alternative 1—Initial Layout

Hazardous materials are handled routinely for construction and demolition activities. The construction contractor working on the proposed development would comply with all applicable permits and use standard BMPs designed specifically to minimize the risk of environmental contamination and harm to human health. The construction contractor would comply with storm water regulations under the CWA to prevent exposure of storm water runoff to construction materials or sediment; therefore, construction use of hazardous materials would produce a negligible impact on human health or the environment. Because Grand Forks County is in a zone of high potential radon levels, the County engineers would design the buildings to reduce the amount of radon that can seep into the interiors.

The County and/or some of its tenants at the business park may have the need to transport to and use hazardous materials for things such as parts washing, painting or stripping, and fuel for backup generators at the business park. Because the individual tenants for the business park are not known at this time, the types and quantities of hazardous materials likely to be used or hazardous wastes that would be generated for Alternative 1 are not known; however, just as any civilian business that uses hazardous materials or generates hazardous wastes, the County and each tenant would be responsible for following the applicable Federal and state laws and regulations for transporting, handling, storing, treating and disposing of hazardous materials and/or hazardous waste. No disposal of any hazardous waste would occur on either the leased parcel or GFAFB.

Because the proposed business park tenants are not expected to consist of Federal agencies like the other tenants on the base, the business park tenants would not participate in the GFAFB environmental management programs. As a condition of the lease, the County would prepare a Hazardous Waste Management Plan (HWMP) that would stipulate the processes and procedures for transporting, handling, storing, treating and disposing of hazardous materials and/or hazardous waste within the business park. The HWMP would be prepared before any hazardous materials are brought onto the project site. Any releases of hazardous wastes to the environment would be the responsibility of the tenant and the County. Provisions in the Air Force lease with the County, and stipulated in the HWMP, would specify the actions the County would need to take with respect to notifying the Air Force of the release. As the overall lessee, the County would be responsible for ensuring that its tenants abide by the laws and regulations; therefore, the impact of using hazardous materials or generating hazardous wastes would be minor and not significant.

4.5.3 Alternative 2—Revised Layout

Impacts for Alternative 2 would be the same as those described for Alternative 1.

4.6 GEOLOGY AND SOILS

The impacts on geological resources and soils would be significant if the alternative exposed soils to uncontrolled erosion or contamination.

4.6.1 *No Action Alternative*

Under the no action alternative, the proposed development would not occur; therefore, there would be no change to the geology or soil in the area.

4.6.2 *Alternative 1—Initial Layout*

Development under Alternative 1 would require grading and excavation of soils to establish structural foundations, buried utilities, and the taxiway for runway connection. Because the terrain is relatively flat with deep sediments and changes in elevation are not expected, topography and geology would not be affected by Alternative 1. In the eastern half of the proposed development, soils have been previously disturbed by construction of the abandoned Alert Pad and its access road, whereas the western half is open grassland. Impacts to soil would be minor and temporary with implementation of the following actions:

- Providing best management practices including stockpiling topsoil
- Covering exposed soil with erosion control blankets or temporary vegetative covers
- Installing erosion control fencing to minimize off-site soil transport from precipitation
- Watering exposed soils to prevent wind erosion
- Controlling compaction from heavy machinery
- Seeding or mulching disturbed area upon completion of construction

Permanent features to minimize off-site soil transport during precipitation would be designed for the development; therefore, no significant impact would occur from implementation of Alternative 1.

4.6.3 *Alternative 2—Revised Layout*

Impacts for Alternative 2 would be the same as those described for Alternative 1.

4.7 LAND USE

A comparative methodology is used to determine impacts to land use at GFAFB. Flight operations, facility operations, and any construction or modification activities associated with each alternative were examined and compared to existing land use conditions and land use plans. Effects were identified as they related to changes in land ownership and use classifications, extent of changes, potential conflicting uses on and off the base, and accessibility concerns.

4.7.1 *No Action Alternative*

Under the no action alternative, the proposed development would not occur; therefore, no change to land use would occur.

4.7.2 *Alternative 1—Initial Layout*

Implementation of Alternative 1 includes the development, construction, and operation of a mixed-use business park. Land use in the project area would change from Open Space to Industrial and Aircraft Operations and Maintenance. This change is consistent with the Grand Forks General Plan which identifies the project area as unconstrained land for expansion. Although the eastern edge of the proposed development abuts the western edge of the southern CZ, it is completely outside the CZ and APZ, and would not result in conflicts with airfield CZs or APZs. Land use beyond the vicinity of the airfield would not be affected by the additional RPA flight operations in Alternative 1. Although there

would be a change in land use in the project area, it is compatible with existing land use plans; therefore, Alternative 1 would have no adverse impact on land use.

4.7.3 *Alternative 2—Revised Layout*

Impacts for Alternative 2 would be the same as those described for Alternative 1.

4.8 NOISE

When evaluating noise effects, several aspects are examined, including: (1) the degree to which noise levels generated by training and operations, as well as ongoing construction, demolition, and renovation activities would be higher than the ambient noise levels; (2) the degree to which there would be hearing loss and/or annoyance; and (3) the proximity of noise-sensitive receptors (e.g., residences, schools, hospitals, parks) to the noise source. An environmental analysis of noise includes the potential effects on the local population. Such an analysis estimates the extent and magnitude of the noise generated by the proposed and alternative actions. For purposes of analysis of activities associated with the development of a mixed-use business park, impacts would be considered significant if the either of the alternatives resulted in a 2-dB DNL increase in persistent noise exposure (e.g., airfield operations) at a sensitive receptor. In addition, based on AICUZ guidance, land-use compatibility recommendations begin when predicted noise exposure levels exceed 65 dB(A) DNL. As such, this can also provide an indicator as to when impacts could be considered significant.

For areas of predicted noise exposure less than the 65 dB(A) DNL, a preferred method of analyzing potential impacts is to examine prevailing ambient noise levels at sensitive receptors and compare the predicted noise exposure from the proposed action or its alternatives. Some increases of noise levels are not readily apparent to listeners. It is well accepted that sound level increases below 3 dB(A) are not perceptible. Additionally, due to the logarithmic nature of the dB, the doubling of a noise event level creates a 3-dB increase. **Table 4-4** presents noise levels and their corresponding perception.

Table 4-4. Decibel changes and perception

Changes in Noise Levels in dB(A)	General Perception
3	Just Noticeable
5	More Noticeable
10	Twice as Loud
20	Much Louder

dB(A) = A-weighted decibel

4.8.1 *No Action Alternative*

Under the no action alternative the construction activities associated with the development of a mixed business park and associated increases to aircraft operations would not occur; therefore, no change to the baseline noise environment would occur.

4.8.2 *Alternative 1—Initial Layout*

Implementation of Alternative 1 includes the development, construction, and operation of a mixed-use business park. For noise effects stemming from construction activities and ongoing operations of facilities, the affected environment is narrowly focused and compact, and generally would include the area lying within ½ mi to 1 mi of the proposed development. Several houses are located within 1 mi of the proposed development; however, the closest is more than 2,000 ft from the nearest boundary. Noise associated with the operation of machinery on construction sites is typically short-term, intermittent, and highly localized. The loudest machinery generally produces peak SPLs ranging from 86 to 95 dB(A) at 50 ft from

the source (**Table 4-5**). It is important to note that the peak SPL range for construction equipment noise does not take into account the ability of sound to be reflected/absorbed by nearby objects, which would further reduce noise levels. Additionally, interior noise levels are typically reduced by 18 to 27 dB(A) due to the noise level reduction properties of the building's construction materials (FAA 1992).

As noted in **Section 3.8.2**, noise associated with construction activities is typically short-term, intermittent, and highly localized. Construction noise does not typically generate a predicted noise exposure of 65 dB(A) DNL or greater because, even at extremely high rates of operation, the equipment itself does not generate noise so intense that averaged over a year it would produce a 65 dB(A) DNL. The construction activities included under Alternative 1 would include site preparation, building, and paving activities. The cumulative noise produced from construction sources would be expected to be about 94 dBA at 50 ft from the source. The sound level would decrease with increased distance from the source resulting in a level of approximately 68 dBA at 1,000 ft and 58 dBA at 3,000 ft (USAF 2010a). Houses near the project area would not be exposed to levels greater than 65 dBA. Additionally, construction activities would occur over an extended period and would generally be much lower than this level. Adherence to standard Air Force Occupational Safety and Health regulations minimizes the risk of hearing loss to construction workers. These regulations require hearing protection along with other personnel protective equipment and safety training. Additional engineering controls that could be implemented to reduce noise include substituting existing equipment with quieter equipment and/or retrofitting existing equipment with damping materials or mufflers. Overall impacts associated with construction noise would not be significant.

Table 4-5. Peak sound pressure level of construction equipment from a distance of 50 feet

Equipment	SPL
Bulldozer	95 dB(A)
Scraper	94 dB(A)
Front Loader	94 dB(A)
Backhoe	92 dB(A)
Grader	91 dB(A)
Crane	86 dB(A)

SPL = sound pressure level (noise from a single source);

dB(A) = A-weighted decibel

Source: Reagan and Grant (1977)

The most recent AICUZ study conducted for GFAFB was in 1994 when they had approximately 30 KC-135R tanker flights per day (USAF 1995); the AICUZ report was revalidated in 2003, which negated the need to redo the study. A new AICUZ study has not been performed since the KC-135R tankers left GFAFB in December 2010. The noise level contours from the AICUZ are presented on **Figure 3-2**. For the *Final EIS for the BRAC Beddown and Flight Operations of Remotely Piloted Aircraft at Grand Forks Air Force Base, North Dakota* (USAF 2010a) noise level contour maps were generated to represent the noise levels with only the CBP UAS in operation and the noise conditions of the beddown of RPA and departure of the KC-135Rs (USAF 2010a). The projected noise level contours for the RPA Beddown, only the CBP UAS operations, and the AICUZ study in 1994 are quite similar, especially in the east-west direction parallel to the runway. The noise contours for the KC-135R extend farther in the north-south direction, likely due to the aircraft's heavier nature and slower ascent. In the vicinity of the proposed EUL, all three sets of contours indicate that the entire EUL area would fall outside of the 65 dB(A) contour, meaning that the DNL for the business development would be less than 65 dB(A) (see **Figure 3-2**). Except for a noise spike near the munitions storage area on the AICUZ contours, none of the aircraft scenarios produce noise levels above 65 dB(A) at the location of sensitive receptors. Using these previously modeled noise contours, any changes in noise levels as a result of implementation of Alternative 1 would not be significant.

4.8.3 Alternative 2—Revised Layout

Impacts for Alternative 2 would be the same as those described for Alternative 1.

4.9 TRANSPORTATION

Impacts to transportation would be significant if traffic counts, roadway design and geometry, or signalization reduces the LOS or does not meet safety criteria as a result of implementation of either alternative. The impacts of flight operations on other air transportation would be significant if the RPA flights created unsafe conditions for other Air Force, government, or civilian air traffic.

4.9.1 No Action Alternative

Under the no action alternative, Grand Forks County development would continue as described in the Grand Forks County Land Use Plan, the GFAFB Master Plan, and consistent with the most current traffic conditions described in **Section 3.9.2**. As a result, no change to existing transportation facilities or traffic conditions would occur on or near GFAFB. Likewise access to the installation would not change.

4.9.2 Alternative 1—Initial Layout

The proposed development would be segregated from GFAFB by fencing with one planned public access point via US-2. Access to the site would be from US-2 across from an existing intersection with north-south oriented 27th Street NE (**Figure 1-1**). The existing access is a single-lane gravel two-track with no turn lane from westbound US-2. Access from eastbound US-2 would be via an existing median crossing that currently has no turn lane. The roadway into and out of the proposed development would be a four-lane undivided section (49-ft width) with curb and gutter. Internal roadways would be a mix of four-lane undivided and three-lane roadways (37-ft width). A security road would be constructed on the north and east sides of the development's fenced perimeter and at least three entry points between the base and development site would be provided for Air Force access to facilitate emergency response and environmental conservation activities.

Construction-related traffic consisting of heavy vehicles, trucks, and cars would be temporary and sporadic, in accordance with proposed development plans. At build out, 2,500 to 3,000 employees would be expected to access the site daily. If each employee used individual vehicles and made two trips per day (one to and one from the facility), an estimated 5,000 to 6,000 daily trips would be generated. Four-lane US-2 has the capacity to handle similar traffic volumes on an hourly rather than daily basis (USAF 2004); thus, no adverse impact to LOS or transportation would likely occur. No impact to GFAFB installation traffic is expected as the development would be completely segregated from the rest of the base.

The County proposes to conduct a traffic study prior to occupation of the business park. It anticipates that the study will indicate the need to construct right and left turn lanes into the site from US-2 to safely accommodate traffic movements out of the site at peak periods. According to the Draft 2014-2017 North Dakota Statewide Transportation Improvement Plan, the NDDOT has plans to make the turn lane modifications on US-2 in this area in Fiscal Year 2014. With the turn lanes installed, the impacts of Alternative 1 on traffic would be minor.

Any potential flight operations would require coordination and approval from the Air Force to use the runway at GFAFB. Alternative 1 does not grant any tenant of the business park Air Force approval to use the runway. In addition to Air Force approval, flight operations would also need FAA approval. As long as flight operations for Alternative 1 follow the regulations or guidelines developed by the FAA for UAS, the impact of flight operations on other air transportation would be minor.

4.9.3 Alternative 2—Revised Layout

Impacts for this alternative would be the same as those described for Alternative 1.

4.10 UTILITIES

Impacts to utilities would be considered significant if services provided to the development exceed the capacity of the existing utility.

4.10.1 *No Action Alternative*

Under the no action alternative, the proposed development would not occur; therefore, there would be no changes to current utilities requirements or usage at GFAFB or surrounding communities.

4.10.2 *Alternative 1—Initial Layout*

Air Force policy requires that the lease-holder obtain utilities from private service contracts whenever possible. If the local utility provider is not willing or able to provide service to the lease development, the base can offer a tie-in to its service distribution system. As of March 2013, Alternative 1 would receive electricity, natural gas, and water from the local service providers; however, sanitary sewer services would be provided by GFAFB (Giltner 2013).

4.10.2.1 Electrical Distribution

The proposed development would connect to one of the existing electrical substations via a buried line. Each building/facility would have an electrical meter and the tenant would be responsible for power usage. The County plans to have the buildings designed and constructed to meet the requirements for LEED Silver certification and incorporate as many energy and water conservation initiatives as practicable; therefore, the impact on the electrical capacity would be minor and within the capacity of the existing system.

4.10.2.2 Water Systems

Water for the development would be obtained from the TRWD 8-in main that runs along the north side of US-2. The system within the proposed development would consist of a series of looped 8-in and 10-in mains generally following the proposed roadways. No adverse impacts to existing water systems or capacity are expected.

4.10.2.3 Wastewater

Wastewater collection and treatment would be provided by the base. The sewer lines used when the Alert Ramp was active have been capped and plugged, so a new force main would be constructed from the proposed development across the airfield to the Building 509 Lift Station. The roughly 6,500-ft long force main would generally follow the alignment of the abandoned force main that previously served the Alert Ramp. GFAFB has indicated that there is sufficient capacity of their wastewater system to handle the load from the development; therefore, the impact on the sewer system would be minor.

4.10.2.4 Stormwater System

Two well-defined drainage ditches run from south to north across the proposed development area. Surface drainage flows north to the Turtle River via these drainage ditches. New storm sewers would be installed to collect run-off from roadways and paved areas. Section 438 of the EISA requires that natural hydrology be maintained or restored to the maximum extent technically feasible. Predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology would be calculated and site design would incorporate stormwater retention and reuse technologies to the maximum extent technically feasible. Post-construction analyses would be conducted to evaluate the effectiveness of the as-built stormwater reduction features. The development would also need to satisfy Grand Forks County Zoning Resolution Storm Water Management requirements, which requires that the site be designed to accommodate the 100-year/24-hour storm, or in this case approximately 5 ac-ft of storage. With these

elements to the plan of Alternative 1, there would be no adverse affects regarding stormwater management.

4.10.3 Alternative 2—Revised Layout

The same utilities would be required and the requirements for stormwater management would not change; therefore, the impacts for Alternative 2 would be the same as those described for Alternative 1.

4.11 SOCIOECONOMIC RESOURCES

Significance for socioeconomic resources varies depending on the setting of the alternative; however, 40 CFR 1508.8 states that indirect effects may include those that are growth inducing and other effects related to induced changes in the pattern of population density or growth rate. Factors considered in determining whether the alternative would have significant adverse impacts include the extent or degree to which its implementation would result in the following: 1) change the growth rate or concentrations of population; 2) substantially reduce employment, personal income, or tax revenues; 3) conflict with housing projections and policies set forth in the installation or regional government plans, 4) displace existing housing; or, 5) disrupt or divide the physical arrangement of an established community.

4.11.1 No Action Alternative

Under the no action alternative, the development of the mixed-use business park would not occur. Consequently, there would be no construction of the business development at GFAFB that could create additional jobs within the ROI. Implementing the No Action Alternative would not change the population growth rate, employment opportunities, tax base, or housing availability within the ROI. Similarly, there would be no effects on the social or economic characteristics in the ROI.

4.11.2 Alternative 1—Initial Layout

Implementing Alternative 1 would result in short- and long-term impacts to several socioeconomic resources within the ROI. The development of the business park would not affect the number of personnel assigned to or employed by GFAFB; however, the portion of the current hay lease on the development site would be eliminated. Due to the projected long-term availability of jobs that would be created from development of the business park, the population within the ROI would be expected to increase. The Grand Forks County 2035 Land Use Plan estimated that between 2000 and 2010, the population of Grand Forks County would grow between 8.0 and 12.7 percent to approximately 71,379 to 74,484 (Grand Forks County 2006); however, it only grew 1.1 percent to 66,861 (USCB 2010a). The population in the Grand Forks, ND-MN MSA only grew at 1.0 percent between 2000 and 2010. Conversely, the population within the ROI decreased 14.5 percent in that timeframe, likely due to BRAC 2005 as noted in **Section 3.11.2.1**. Population growth projections between 2010 and 2020 are for an estimated 1 percent population growth in Grand Forks County, or about 669 additional residents (BBC Research & Consulting 2012). Alternative 1 is expected to create an estimated 2,500 to 3,000 jobs by completion of the development. The build-out is scheduled to occur over a 10- to 20-year timeframe, increasing the availability of long-term construction jobs. Grand Forks County and the ROI may see a population growth greater than both historic trends and County projections as a result of the immigration of new employees and their families from the growth of directly and indirectly related employment opportunities.

Since the purpose of the business park development is to support research and development, testing and evaluation, and operations of UAS activities, it is expected that, outside the construction-based jobs, the majority of the directly related jobs would be in the professional, scientific, management, and educational services sectors. In addition, the immigration of employees and their families to fill directly related jobs would drive the creation of indirectly related jobs in such areas as the retail, food services, and housing sectors.

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Creation of additional employment opportunities as described above would be expected to decrease an already low unemployment rate, although a majority of the directly related jobs would likely be filled from outside of the Grand Forks region. The unemployment rate for North Dakota is ranked as the lowest in the United States; in 2010 the unemployment rate for the state was 2.7 percent and the average rate in the census tracts that make up the ROI was 1.8 percent. The increased employment opportunities could also decrease the unemployment rates for the Grand Forks, ND-MN MSA since it would be expected that many of the construction jobs would be sourced from local businesses in that area.

An influx of the maximum projected jobs (3,000) into the ROI, County, and MSA, directly related to the development, would increase employment by 39.0, 7.6, and 5.3 percent, respectively. Because development is scheduled to occur over a 10- to 20-year time frame, these increases would be spread out over that time. The most immediate increase would likely be realized with jobs in the construction sector. The addition of professional, scientific, management, and educational jobs in the ROI would be expected to change the employment characteristics of the ROI and County, and to a lesser extent the Grand Forks, ND-MN MSA. In addition, there would likely be increases to sectors indirectly related to the development such as retail, food and other services, health, manufacturing and public administration. Median individual and household income may increase somewhat in the ROI and County as the percentage of employment shifts to higher paying professional, scientific, and management jobs. In addition, the direct (business park) and indirect (housing) availability of long-term construction jobs would also attract more people to the area.

The County estimates that the tax base would increase by more than \$69 million during the first 5 years of development. At the end of the 20-year development period, provided all the facilities are constructed, the county tax base would increase by an estimated \$220 million. In addition, an increase of median individual and household incomes would also increase the tax base in the ROI, county, and the MSA. Implementing Alternative 1 would provide beneficial impacts to employment, income, and tax revenues within the ROI, Grand Forks County, and the Grand Forks, ND-MN MSA.

The availability of housing in the ROI and county, as well as in the city of Grand Forks is currently in short supply; however, several large subdivisions throughout the city are in planning or early construction phases. The jobs created by the development of the business park would be spread out over 10 to 20 years, with the first jobs not being filled until after completion of the initial two facilities, which are expected to be completed within 2 years. The development and construction of the proposed business park would likely spur even more housing development in the higher value homes because the jobs being created include professional, scientific, management, and educational services positions that would be able to afford higher priced homes. Although this type of housing construction is good for the construction industry and the tax base, it is not necessarily good for lower income residents. The proposed development would include lighting typical of a mixed-use business park. Lighting would be consistent with energy conservation measures and lighting intensity on the installation, including illumination associated with security needs. The closest residence is more than 2,000 ft from the nearest boundary, southeast of the proposed development and toward the more developed portions of the installation. Alternative 1 would have an adverse, but not significant impact on area housing.

The Grand Forks Public Schools currently has the capacity to accept nearly 3,000 more students and has a five-year program to monitor and evaluate the enrollment growth. They anticipate that some school boundary lines may need adjustment as certain areas of the city grow faster than others, and new schools may need to be constructed to grow beyond their current capacity (Thompson 2013). Because the influx of employees to the business development would occur over time, the district appears to be prepared to manage the school enrollment increases the new employees would bring; therefore, Alternative 1 would have an adverse, but not significant impact on area schools.

There would be additional responsibility for law enforcement and fire protection from the County Sheriff's Department and Emerado Volunteer Fire Department; however, it is unlikely that this development would significantly overload the capabilities of either department. With the UND School of Medicine and Health Sciences in the City of Grand Forks, as well as other regional health care providers, the influx of families of the employees of the development would not overburden the regional medical services.

4.11.3 Alternative 2—Revised Layout

Impacts for Alternative 2 would be the same as those described for Alternative 1.

4.12 ENVIRONMENTAL JUSTICE

Environmental justice is achieved when everyone, regardless of race, culture, or income, enjoys the same degree of protection from environmental and health hazards and has equal access to the decision-making process. Significant environmental justice impacts would result if access to decision-making documents were denied or if any adverse environmental or health effects occurred from an action that would disproportionately and highly adversely affect minority or low-income populations.

4.12.1 No Action Alternative

Under the no action alternative, the proposed development would not occur; therefore, there would be no potential disproportionate impacts from development to minorities or low-income populations.

4.12.2 Alternative 1—Initial Layout

Since none of the census tracts within the ROI meet the definition of a concentrated minority area or poverty area, potential impacts would not be disproportionate.

4.12.3 Alternative 2—Revised Layout

Impacts for Alternative 2 would be the same as those described for Alternative 1.

4.13 OCCUPATIONAL HEALTH AND SAFETY

An impact on occupational health and safety would be significant if there was a substantial increase in risk to the safety and health of Air Force employees, others at GFAFB, or employees associated with the proposed development.

4.13.1 No Action Alternative

Under the no action alternative the construction activities associated with the development of a mixed business park and associated increases to aircraft operations would not occur; therefore, no change to the existing health and safety risk would occur.

4.13.2 Alternative 1—Initial Layout

Implementation of Alternative 1 includes the development, construction, and operation of a mixed-use business park, and the potential flight operations of UAS upon flight approval of both the FAA and the Air Force.

Because the development area would be restricted from the rest of the base, the construction and demolition contractors would not interact with base traffic or personnel; therefore, there would be no expected increase in risk to base personnel from these operations. Contractors working at the development site, as well as employees of tenant organizations upon development completion, would follow industry accepted safety practices.

The UAS flight operations from Alternative 1, as with other aviation activities at the base, poses potential risks to the military, civilian, and other tenant personnel at GFAFB. Flight operations from tenants of the development would only be conducted under the approval of both the Air Force and FAA. The Air Force would need to approve use of its runway and airspace for take-off and landing of the RPAs. If granted approval from the Air Force, the GFAFB Flight Operations would need to schedule the sorties in with the existing uses of the flight line and runway and the managed air space around the base. The Air Force has

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several manuals and instructions for the safe use of its airfields and would be responsible for maintaining safe operations.

In addition to Air Force approval to use the GFAFB runway and airspace, the activities of UAS as a result of Alternative 1 would need FAA approval to fly. The County is anticipating the designation of North Dakota as a test area for the FAA integration of UAS into the national airspace (NAS) as a result of the passage of the FAA Modernization and Reform Act of 2012. If that happens, the FAA would promulgate regulations and rules to be followed by UAS operators to ensure that the airspace integration does not impose a risk on the operators or the public. Currently, the FAA requires that someone wishing to fly an RPA apply for and receive a Special Airworthiness Certificate, in the Experimental Category in order to fly in the NAS. To obtain a certificate, applicants must demonstrate that their UAS can operate safely within an assigned flight test area and cause no harm to the public. The act of issuing the certificate requires FAA to ensure that the operation of the UAS would not increase the risk to Air Force personnel on the ground or the public.

Due to the extensive Air Force and FAA approval processes and their respective management of the runway and airspace, RPA flight operations as a result of Alternative 1 would have an adverse, but not significant impact on occupational health and safety.

4.13.3 *Alternative 2—Revised Layout*

Impacts for Alternative 2 would be the same as those described for Alternative 1.

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5.0 CUMULATIVE IMPACTS AND OTHER ENVIRONMENTAL CONCERNS

The CEQ defines cumulative effects as the “impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). Although individual impacts of various actions might be minor, taken together their effects could be significant.

5.1 PAST, ONGOING, AND REASONABLE FORESEEABLE FUTURE ACTIONS

Cumulative effects can occur when a relationship exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the proposed action would be expected to have more potential for a relationship than those more geographically separated. Similarly, actions that coincide, even partially, in time have a potential for cumulative effects.

The most relevant past, ongoing, and reasonably foreseeable future actions to the proposed action are the numerous installation development projects being implemented at GFAFB to fulfill its current and future mission needs. An EA was conducted in 2010 to evaluate the impacts of 10 demolition, 13 construction, and 7 infrastructure projects over a 5-year period. In addition, the EIS evaluating the beddown of an RPA mission at GFAFB identified 22 construction, demolition, renovation, and repair projects necessary to support the mission.

For flight operations, the ongoing actions with potential cumulative effects include the three flying units at GFAFB: the CBP has two Predator B RPA; the 69th Reconnaissance Squadron has six Global Hawk RQ-4 Block 40; and the North Dakota Air National Guard has four Predator (MQ-1) as well as the use of the base by UND for their UAS pilot training program. The Air Force is currently preparing an EIS for the KC-46A formal training unit (FTU) and the first main operating base (MOB1) basing action. GFAFB is one of the reasonable alternative locations evaluated for the MOB1 mission in the EIS; therefore, it is mentioned under cumulative impacts.

5.2 CUMULATIVE EFFECTS

This section addresses the impacts of the cumulative scenario and then the extent that the alternatives would contribute to that impact. Since the only difference between the two alternatives is the layout of the buildings and roads, and the resulting difference in the loss of wetlands, all of the cumulative effects are evaluated for Alternative 1, whereas Alternative 2 is only mentioned when the cumulative effect would be different than Alternative 1.

Alternative 1 involves the construction and operation a mixed-use business park and potential flight operations conducted by one or more tenants of the development. There are also several construction projects associated with the past, ongoing, and reasonably foreseeable future actions. The potential impacts resulting from the construction activity are generally localized and individually of relatively short duration, except for the loss of wetlands and grassland habitat for migratory birds. The Air Force and the County would need to ensure that the construction contractors for all of the construction demolition and infrastructure projects use BMPs for air quality, water quality, and soils to reduce any potential impacts on those resources.

The proposed action's effects on wetlands would be adverse, but not significant with Alternative 2. The development plans would avoid impacting wetlands to the maximum extent practicable and would mitigate by minimization and restoration for the wetland disturbance that could not be avoided along with other requirements or activities stipulated by the USACE issued 404 Permit under the CWA. Very few of the other projects identified in the cumulative environment had much, if any, impact on wetlands. Those projects would also need to avoid and minimize impacts to wetlands, so the cumulative impact would be less than significant.

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The proposed action's effects on grassland and habitat for migratory birds would be cumulative with other construction projects within the base; however, the proposed action would minimize, to the maximum extent practicable, any impacts on grassland or wetland habitats.

Operational impacts are long-term and may have a broader impact on some resources. Although the operation of heating and cooling equipment and emergency generators would contribute to air quality impacts, AQCR 172 is in attainment for all priority pollutants and the cumulative activities at GFAFB would not be expected to have a major effect on air quality.

Because Alternative 1 would not be using the hazardous waste management or on-base utilities, other than sewage collection and treatment, there would be no cumulative impact on those resources. Cumulative effects to hazardous waste management and utilities off the installation would be minor, as the existing infrastructure can accommodate the relatively small increases in hazardous waste generation and utilities usage. The sewage treatment system has accommodated larger on-base populations in the past; therefore, there is adequate capacity to handle the cumulative increase in personnel.

Cumulative effects could be created with transportation and socioeconomic resources. US-2 has accommodated larger personnel commute volumes in the past; therefore, with the planned improvements at the entrance to the business park, there should be no significant adverse cumulative effects on traffic. The cumulative effect of the business park on the socioeconomic resources of Grand Forks County would be beneficial. Although unemployment is low, either alternative could generate high paying professional jobs in the region. The cumulative impact on the housing shortage may have a short-term negative impact on the cost of housing in the region; however, the development is expected to bring in additional housing construction jobs to help fill the need for housing.

There could be increased safety and noise issues with respect to the addition of RPA flight activity, especially if the KC-46A MOB 1 were assigned to GFAFB. As with the CBP, the flight operations from the proposed action would not be required to fly in restricted airspace; therefore, there would be no cumulative impact due to airspace closure. The Air Force would be responsible for making sure that cumulative flight operations do not pose a safety issue for take-off and landing. The requirements imposed on the flight operations by the FAA either through regulations on the test area airspace or through a Certificate of Authorization (COA) or other FAA approval would keep the cumulative use of the airspace safe. The Air Force has flown much louder aircraft on a regular basis from GFAFB; therefore, the cumulative effect on noise by the additional RPA flights would not be significant.

5.3 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

CEQ regulations (40 CFR 1502.16) specify that environmental analyses must address "...the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Special attention should be given to impacts that narrow the range of beneficial uses of the environment in the long-term or pose a long-term risk to human health or safety. A short-term use of the environment is generally defined as a direct consequence of a project in its immediate vicinity. Changes to long-term productivity generally refer to negative impacts to the long-term quality of the land, air or water.

The only change with the long-term productivity of the development area is the conversion of the wetland and hay lease land uses to buildings, roads and other infrastructure. EO 11990, *Protection of Wetlands*, requires federal agencies to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. With cooperation from GFAFB, the County and its representatives are working with the USACE to ensure that any disturbance to wetlands would be appropriately mitigated, thereby avoiding any adverse long-term productivity. The hay lease is used by GFAFB in this area as a conservation management tool. The hay lease is not a significant aspect of the open area of the base; therefore, the impact on the habitats in the area would have an adverse, but not significant, effect on long-term productivity.

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

5.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires that environmental analysis include identification of any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources has on future generations. Irreversible effects primarily result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action.

Resources used for either alternative include building materials (for construction of facilities), concrete and asphalt (for parking lots and roads), and various material supplies (for infrastructure) and would be irreversibly lost. These resources are not in short supply, would not limit other unrelated construction activities, and would not be considered significant. In addition, energy resources used as a result of the proposed action would be irretrievably lost. These include petroleum-based products (e.g., gasoline and diesel), natural gas, and electricity. During construction, gasoline and diesel would be used for the operation of construction vehicles. During operation, gasoline or diesel would be used for the operation of privately owned and vehicles and the RPAs. Natural gas and electricity would be used by operational activities of the development. Consumption of these energy resources would not place a significant demand on their availability in the region.

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Grand Forks Air Force Base, North Dakota**

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Grand Forks Air Force Base, North Dakota**

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APPENDICES

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Grand Forks Air Force Base, North Dakota**

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**APPENDIX A
INTERAGENCY AND INTERGOVERNMENTAL COORDINATION
FOR ENVIRONMENTAL PLANNING (IICEP) LETTERS**

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Grand Forks Air Force Base, North Dakota**

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**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

MEMORANDUM FOR DISTRIBUTION

FROM: 319 CES/CC
525 Tuskegee Airmen Blvd
Grand Forks AFB ND 58205-6434

SUBJECT: Draft Environmental Assessment of the Proposed Mixed-Use Business Park on an Enhanced Use Lease at Grand Forks Air Force Base, North Dakota

1. Grand Forks Air Force Base (AFB) is preparing an Environmental Assessment (EA) addressing potential environmental impacts of activities associated with the development of a mixed-use business park by Grand Forks County (County) on land that would be leased to the County by Grand Forks AFB in accordance with the United States (US) Air Force Enhanced Use Lease Program under authority of Title 10 US Code Section 2667.
2. The environmental impact analysis process for the Proposed Action and alternatives is being conducted in accordance with Council of Environmental Quality (CEQ) guidelines pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended (42 US Code 4321, et seq.), CEQ regulations for implementing the procedural provisions of NEPA at Title 40 of the Code of Federal Regulations (CFR) Sections 1500-1508 (40 CFR 1500-1508), and the Air Force Environmental Impact Assessment Process (EIAP) at 32 CFR 989.
3. This EA identifies, describes, and evaluates the potential environmental impacts that are associated with the County developing, constructing and operating a mixed-use business park on underutilized, non-excess land leased from Grand Forks AFB. The proposed action also includes the launch and recovery of remotely piloted aircraft (RPA) subject to notice to the County, written request to the AF for its review and approval, and compliance with Federal Aviation Administration (FAA) regulations. The potential environmental effects of taking no action are also described.
4. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the attached Description of the Proposed Action and Alternatives and solicit your comments concerning the proposal and any potential environmental consequences. Also enclosed is the distribution list for other federal, state, and local agencies that have been contacted. If there are additional agencies that you feel should review and comment on the proposal, please include them in your distribution of this letter and the attached materials.
5. Please provide any comments or information directly to the 319 CES/CEAO, 525 Tuskegee Airmen Blvd. Grand Forks AFB, ND 58205, within 30 days from the date of this correspondence. If members of your staff have any questions, the point-of-contact is Public Affairs Office, at 701-747-5023, or email at 319ABW.PA@us.af.mil. A copy of the DEA can be downloaded from the website: <http://www.grandforks.af.mil/library/index.asp>.

LESLIE W. CANNAR
Deputy Base Civil Engineer Colonel USAF
Commander

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 319TH AIR BASE WING (AMC)
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

Colonel Paul E. Bauman
Commander, 319th Air Base Wing
460 Steen Blvd
Grand Forks AFB, ND 58205

OCT 22 2013

Kevin Leecy, Chairman
Bois Forte Band of Chippewa Indians
5344 Lakeshore Drive, PO Box 16
Nett Lake, MN 55772

Dear Chairman Leecy,

Grand Forks Air Force Base (GFAFB) is preparing an environmental assessment proposing to lease approximately 217 acres to Grand Forks County for the purpose of developing, constructing and operating a mixed-use business park. The County will develop the business park to support research and development, testing and evaluation, and operations of unmanned aerial systems, as well as activities centered on the development of sensor technology and data management. The County is planning to work with private developers to create a business park that would offer some of the advantages of proximity to an Air Force base with the flexibility and responsiveness of a private development.

With this letter, GFAFB invites the Bois Forte Band of Chippewa Indians to provide input regarding this NEPA analysis, as well as on any National Historic Preservation Act (NHPA) Section 106 concerns with this proposed action. The Description of the Proposed Action and Alternatives (Atch 1 on CD) along with a map (Atch 2) of the proposed lease area are enclosed for your thoughtful review.

Grand Forks County would be subject to any required Air Force approvals to reconnect the existing taxiway from the former aviation parking ramp to the operational runway. Individual tenants approved by the County would need to specifically request Air Force permission and approval to use the taxiway and runway to launch and recover remotely piloted aircraft (RPA). The proposed action would include the launch and recovery of up to 100 RPA sorties per month (averaging 3 to 4 per day) subject to necessary Air Force approvals and Federal Aviation Administration (FAA) regulations. If granted all necessary Air Force permissions, business park tenants would launch RPA sorties that consist of launch, climbing to an operational altitude, flying at altitude, and returning to base. No live munitions would be carried by the RPA.

We request your assistance in identifying and evaluating if there are any significant cultural resources in the area of potential effect, defined as the installation where operations will occur. Please utilize the consultation questionnaire (Atch 3) to indicate your preference(s) regarding any concerns and future involvement in this process.

My staff will be contacting your office by telephone to discuss the proposed lease for a mixed-use business park on GFAFB. For staff questions, comments, or NHPA Section 106 review and process, please contact Ms. Kristen Rundquist, Grand Forks AFB Cultural Resources Manager, kristen.rundquist@us.af.mil, 701-747-4774. I look forward to receiving any input you may have regarding this undertaking.

Sincerely,

Signature on original

PAUL E. BAUMAN, Colonel, USAF
Commander

Attachments:

1. Description of the Proposed Action and Alternatives on Compact Disc
2. Map of Proposed Undertaking Area
3. Consultation Questionnaire

cc: Ms Rosemary Berens, Bois Forte Heritage Center

	TRIBE	CHAIRMAN	THPO/Environmental Contact
1	Bois Forte Band of Chippewa Indians	Kevin Leecy, Chairman Bois Forte Tribal Government - Nett Lake 5344 Lakeshore Drive, PO Box 16 Nett Lake, MN 55772	Ms Rosemary Berens Bois Forte Heritage Center, 1500 Bois Forte Rd, Tower, MN 55790 218-753- 6017 ext 11 rozeberens@yahoo.com
2	Cheyenne River Sioux Tribe	Kevin Keckler, Chairman PO Box 590 Eagle Butte, SD 57625	Steve Vance, CRST Preservation Office PO Box 590 Eagle Butte, SD 57625 605-964-7554, steve.vance@crst-nsn.gov
3	Crow Creek Sioux Tribe	Brandon Sazue Sr., Chairman PO Box 50 Ft. Thompson, SD 57339-0050 Phone (605) 245- 2221 Fax (605) 245-2470	Wanda Wells, THPO PO Box 50 Fort Thompson, SD 57339 Tel: 605.245.2221 Email: wandawells@midstatesd.net
4	Flandreau Santee Sioux Tribe	Anthony Reider, President PO Box 283 Flandreau, SD 57028	Carol Robertson, THPO P.O. Box 283, 603 W. Broad Ave., Flandreau, SD 57028 Tel: 605.997.3891 Ext 1226 Email: carol.robertson@fsst.org
5	Fond du Lac Band of Lake Superior Chippewa	Karen R. Diver, Chairwoman 1720 Big Lake Road Cloquet, MN 55720	LeRoy Defoe, THPO 1720 Big Lake Road Cloquet, MN 55720 Tel: 218.878.7129 Fax: 218.878.7130 Email: leroydefoe@fdlrez.com
6	Grand Portage Band of Lake Superior Chippewa	Norman W. Deschampe, Chairman PO Box 428 Grand Portage, MN 55605	Mary Ann Gagnon, THPO Robert Swanson, Assistant THPO PO Box 428 Grand Portage, MN 55605 Tel: 218.475.0111 Fax: 218.475.2292 Email: maryanng@grandportage.com
7	Leech Lake Band of Chippewa Indians	Chairwoman Carri Jones Minnesota Chippewa Tribe Leech Lake Band of Ojibwe 115 6th Street NW, Ste. E Cass Lake, MN 56633 Phone: 218-335-8200	Gina Lemon, THPO Leech Lake Historic Preservation Office 115 6th Street, NW, Suite E Cass Lake, MN 56633 Tel: 218.335.2940 Fax: 218.335.2974 Email: glemon@live.com

	TRIBE	CHAIRMAN	THPO/Environmental Contact
8	Lower Brule Sioux Tribe	Michael Jandreau, Chairman 187 Oyate Circle Lower Brule, SD 57548-0187 Phone: 605-473-0561 or (605) 473-5561	Clair Green, Cultural Resources, Phone: (605) 473-8037, Email: clairsgreen@yahoo.com, Lower Brule Sioux Tribe PO Box 187 Lower Brule, SD 57548-0187
9	Lower Sioux Indian Community Council	Denny Prescott, President 39527 Res. Highway 1, PO Box 308 Morton, MN 56270 Tel: 507-697- 6185	Grace Goldtooth, THPO 32469 County Highway 2 Morton, MN 56270 Tel: 507.697.6321 Fax: 507.697.6310 Email: lowersiouxthpo@gmail.com
10	Mille Lacs Band of Ojibwe	Melanie Benjamin, Chief Executive Mille Lacs Band Government Center 43408 Oodena Drive Onamia, MN 56359 Phone: 320-532-4181 Fax: 320-532-7505	Natalie Weyaus, THPO 43408 Oodena Drive Onamia, MN 56359 Tel: 320.532.7450 Fax: 320.532.7514 Email: natalie.weyaus@millelacsband.com
11	Oglala Sioux Tribe	Bryan Brewer, President, Oglala Sioux Tribe PO Box 2070 Pine Ridge, SD 57770-2070 Phone: (605) 867-5821 Fax: (605) 867- 6076	Joyce Whiting, Natural Resources email: ostnrrathpo@gwtc.net, 605-867-5624 Wilmer Mesteth, THPO PO Box 419 Pine Ridge, SD 57770 Tel: 605.867.5969 Fax: 605.867.2818 Email: ostnrrathpo@gwtc.net
12	Prairie Island Indian Community	Prairie Island Indian Community, Johnny Johnson, President 5636 Sturgeon Lake Road, Welch, MN 55089	Environmental Specialist, Kyle Herdina, Phone: 651-385-4165 Email: kherdina@piic.org
13	Red Lake Band of Chippewa Indians	Floyd Jourdain, Chairman PO Box 550 Red Lake MN 56671	John LeBlanc, email: jleblanc@redlakenation.org Cody Charwood email: ccharwood@redlakenation.org Phone: 218-679-3959

	TRIBE	CHAIRMAN	THPO/Environmental Contact
14	Rosebud Sioux Tribe	Cyril L. Scott , Chairman 11 Legion Ave Rosebud, SD 57570 Tel: (888) 747-2381	Russell Eagle Bear, THPO PO Box 809 Rosebud, SD 57570 Tel: 605.747.4255 Fax: 605.747.4211 Email: rstthpo@yahoo.com
15	Shakopee Mdewakanton Sioux Community	Charlie Vig, Chairman, Shakopee Mdewakanton Sioux Community 2330 Sioux Trail NW - Prior Lake, MN 55372 Phone: 952-445-8900	Leonard Wabasha, Director culturalresources@shakopeedakota.org
16	Sisseton-Wahpeton Oyate	Robert Shepherd, Chairman PO Box 509 Agency Village, SD 57262-0509	Dianne Desrosiers, THPO PO Box 907 205 Oak St. E, Suite 121 Sisseton, SD 57262 Tel: 605.698.3584 Fax: 605.698.4283 Email: dyandancer@yahoo.com
17	Spirit Lake Tribe	Russell McDonald, Chairman Spirit Lake Tribe PO Box 359 Fort Totten, ND 58335	Mr. Darrell Smith Spirit Lake Tribe Tribal Historic Preservation Office P.O. Box 359 Fort Totten, ND 58335 Phone: (701) 766-4221 Cell: (701) 381-9082 Fax: (701) 766-4126 darrells@gondtc.com
18	Standing Rock Sioux Tribe	Charles Murphy, Chairman, Standing Rock Sioux Tribe, PO Box D, Ft. Yates, ND 58538-0522 Phone: (701) 854-8500	Standing Rock Sioux Tribe Waste'Win Young, THPO PO Box D Fort Yates, ND 58538 Email: wyoung@standingrock.org Tel: 701-854-2120

	TRIBE	CHAIRMAN	THPO/Environmental Contact
19	Three Affiliated Tribes of the Fort Berthold Reservation, North Dakota or the Mandan, Hidatsa & Arikara Nation	Tex "Red Tipped Arrow" Hall, Chairman Fort Berthold Indian Reservation 404 Frontage Road New Town, ND 58763-9402 Telephone: 701-627-4781	Elgin Crows Breast, THPO 404 Frontage Road, New Town, ND 58763 Email: redhawk@mhanation.com Tel: 701.862.2474
20	Turtle Mountain Band of Chippewa Indians of North Dakota	Merle St. Claire, Chairman 4180 Highway 281 Belcourt, ND 58316	Bruce Nadeau, THPO Turtle Mountain Band of Chippewa Tribal Historic Preservation Office PO Box 900 Belcourt, ND 58316-0900 Phone: (701) 477-2640 Fax: (701) 477-5393 brucefnadeau@gmail.com
21	Upper Sioux Indian Community	Kevin Jensvold, Chairman PO Box 147 Granite Falls, MN 56241	Marlow LaBatte, THPO PO Box 147 Granite Falls, MN 56241 Tel: 320.564.3853 Fax: 320.564.4482 Email: marlowl@uppersiouxcommunity-nsn.gov
22	White Earth Ojibwe	Erma Vizenor, Chairwoman PO Box 418 White Earth, MN 56591	Renee Lampi, THPO PO Box 418 White Earth, MN 56591 Fax: 218.983.3253 Email: reneel@whiteearth.com phone change to reception: 218-983-3285
23	Yankton Sioux Tribe	Thurman Cournoyer, Chairman P.O. Box 1153, Wagner, SD. 57380	Stephanie Cournoyer, THPO Box 1153 / 800 Main Avenue SW Wagner, SD 57380 Tel: 605.384.3641 Email: yst.thpo@gmail.com



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 319TH AIR BASE WING (AMC)
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

28 Oct 13

Mr. Leslie W Canarr
319 CES/CD
525 Tuskegee Airmen Blvd
Grand Forks AFB, ND 58205-6434

Merlan E. Paaverud
State Historic Preservation Officer
State Historical Society of North Dakota
612 East Boulevard Ave
Bismarck, ND 58505-0200

Dear Mr. Paaverud

The United States Air Force is preparing an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) to assess the potential environmental consequences associated with leasing approximately 217 acres of Grand Forks AFB property to the Grand Forks County for the purpose of developing, constructing and operating a mixed-use business park. The proposed lease area contains approximately 30 concrete acres of an aircraft parking ramp (Alpha Pad) that is currently detached from the active runway, three acres of gravel road, 3,100 feet of security wall, 24 acres of wetlands, and the remaining 160 acres are open grassland. Twenty-three acres of the open grassland are currently hayed annually, while the rest remains idle. Photos of the project area are attached for your reference (Atch 1). The County would develop the business park to support research and development, testing and evaluation, and operations of unmanned aerial systems (UAS), as well as activities centered on the development of sensor technology and data management. The County would work with private developers to create a business park that would offer some of the advantages of proximity to an Air Force base with the flexibility and responsiveness of a private development. The EA evaluates the potential impacts of two action alternatives to the proposed action and a no action alternative. The primary difference between the two alternatives is the layout of the buildings and roads to account for avoidance and minimization of construction impacts to wetlands.

In addition, the County desires to reconnect the existing taxiway from the former aircraft parking ramp (Alpha Pad) to the operational runway. Individual tenants approved by the County would need to specifically request Air Force permission and approval to use the taxiway and runway to launch and recover remotely piloted aircraft (RPA). The proposed action would include the launch and recovery of up to 100 RPA sorties per month (averaging 3 to 4 per day) subject to necessary Air Force approvals and Federal Aviation Administration (FAA) regulations. If granted all necessary Air Force permissions, business park tenants would conduct RPA sorties that consist of launch, climbing to an operational altitude, flying at altitude, and returning to base. No live munitions would be carried by the RPA. The proposed actions are available for your review in the attached draft on compact disc (Atch 2).

In compliance with the National Historic Preservation Act (NHPA) and 36 CFR 800, Grand Forks AFB, hereby enters into Section 106 consultation regarding the proposed undertaking. The Area of Potential Effect (APE) for this effort is within the base boundary and generally located in the southwest corner of the airfield area (Atch 3). In 1995 and 1996, a Class III intensive archaeological survey of Grand Forks AFB was conducted that included the APE for this undertaking. All sites and finds were determined not eligible for inclusion in the National Register of Historic Places. The northern part of the APE was considered to have a high to medium potential for the presence of cultural resources and the southern half was thought to have a low probability for having cultural resources. Isolated Find 32GFX182 spot is located in the north section of the proposed lease area. It consisted of the distal portion of a prehistoric chert flake fragment weighing less than 0.1 gram and a large calcined mammal bone. The recovered items were not considered significant. The north and south rights-of-way of portions of U.S. Highway 2 were surveyed for cultural resources in 1998 for the ND Department of Transportation including those sections immediately south of Grand Forks AFB (Kinney 1998). No prehistoric or historic cultural resource sites were observed within this area. There are no buildings within the APE. Buildings once existed adjacent to the airfield parking pavement, but were demolished in 2008. An EA was accomplished at that time with concurrence between the Air Force and the ND SHPO that no historic properties were affected with that undertaking.

Grand Forks AFB suggests that the proposed undertaking to lease 217 acres of federal property to the County for the purposes of developing a mixed-used business park would result in a finding of "No Historic Properties Affected" and we request concurrence on this finding from your office pursuant to Section 106 of the NHPA. Should you have any questions or need additional information please call/email Ms. Kristen Rundquist, Cultural Resources Manager at (701) 747-4774 or kristen.rundquist@us.af.mil.

If we do not hear from you within 30 days of receipt of this letter, we will assume that you do not object to our proposed determination of no historic properties affected. We then will proceed with the Environmental Impact Analysis Process under NEPA, subject to the provisions of 36 CFR 800.13 for treating historic properties discovered during an undertaking. Thank you for your time and efforts.

Sincerely,



LESLIE W. CANARR, GS-13, DAFC
Deputy Base Civil Engineer

Attachments:

1. Project Area Photos
2. Draft Environmental Assessment
3. Location Map

Attachment 1 – Parcel Photos

Open Grassland



APRIL 2014

A-13

Open Grassland



APRIL 2014

A-14

Open Grassland/Hayland



APRIL 2014

A-15

Gravel Road/Hay Land



APRIL 2014

A-16

Security Wall (18 ft high)



APRIL 2014

A-17

Aircraft Parking Apron & Security Wall



APRIL 2014

A-18

Aircraft Parking Apron & Security Wall



APRIL 2014

A-19

Attachment 2 – Draft Environmental Assessment on Compact Disc

Attachment 3 -- Location Grand Forks Air Force Base

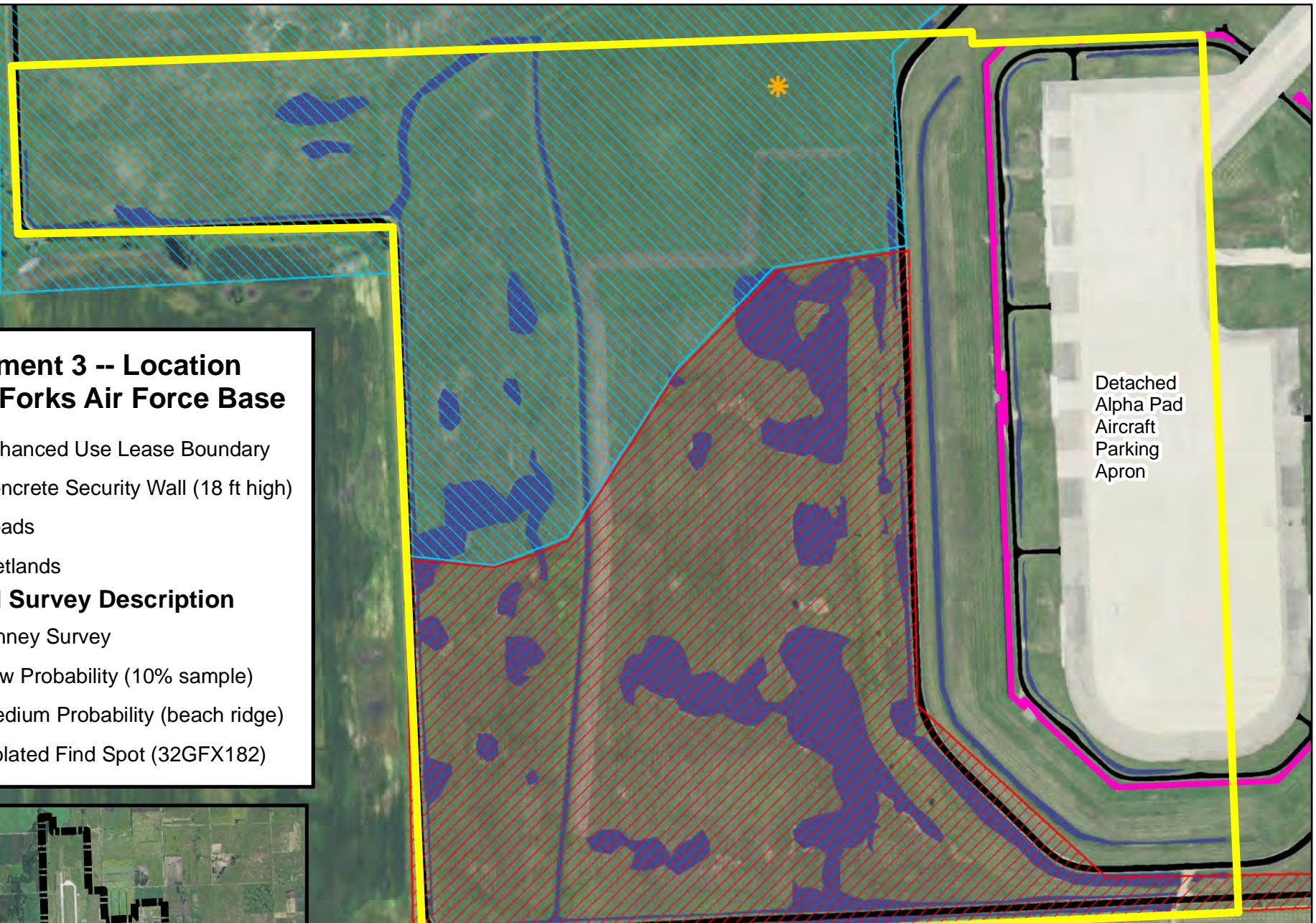
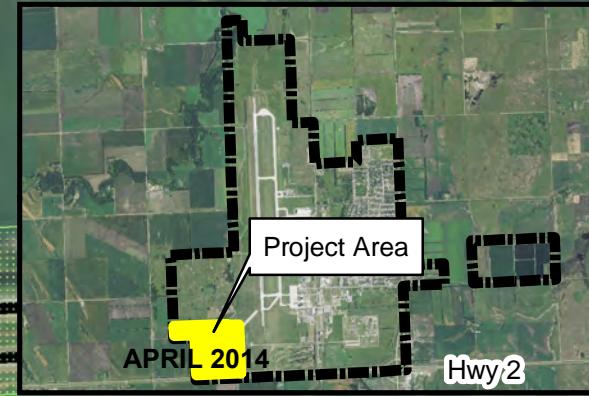
Enhanced Use Lease Boundary
Concrete Security Wall (18 ft high)

Roads

Wetlands

Cultural Survey Description

- Kinney Survey
- Low Probability (10% sample)
- Medium Probability (beach ridge)
- * Isolated Find Spot (32GFX182)



0 0.25 Miles

A-21
0.5 Miles



Jack Dalrymple
Governor of North Dakota

November 1, 2013

North Dakota
State Historical Board

Calvin Grinnell
New Town - President

A. Ruric Todd III
Jamestown - Vice President

Margaret Puetz
Bismarck - Secretary

Albert I. Berger
Grand Forks

Gereld Gerntholz
Valley City

Diane K. Larson
Bismarck

Chester E Nelson, Jr.
Bismarck

Sara Otte Coleman
*Director
Tourism Division*

Kelly Schmidt
State Treasurer

Alvin A. Jaeger
Secretary of State

Mark Zimmerman
*Director
Parks and Recreation
Department*

Grant Levi
*Director
Department of Transportation*

Merlan E. Paaverud, Jr.
Director

Accredited by the
American Alliance
of Museums since 1986

Mr. Leslie W. Canarr
319 CES/CD
525 Tuskegee Airmen Blvd
Grand Forks AFB 58205-6434

ND SHPO 97-0527CL: EA to assess leasing approximately 217 acres of GF AFB property for commercial development in portions of [T152N R53W Section 34] Grand Forks County, North Dakota

Dear Mr. Canaar,

We reviewed ND SHPO 97-0527CL: EA to assess leasing approximately 217 acres of GF AFB property for commercial development in portions of [T152N R53W Section 34] Grand Forks County, North Dakota, and concur with a "No Historic Properties Affected" determination, provided the project remains as described in your letter dated October 28, 2013.

Thank you for the opportunity to review this project. If you have any questions please contact Susan Quinnell, at (701) 328-3576 or squinnell@nd.gov. Thank you for the excellent documentation package, and the opportunity to review.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 319TH AIR BASE WING (AMC)
GRAND FORKS AIR FORCE BASE, NORTH DAKOTA**

25 Nov 2013

MEMORANDUM FOR SEE DISTRIBUTION LIST

FROM: 319 CES/CD
525 Tuskegee Airmen Boulevard
Grand Forks AFB, North Dakota 58205-6434

SUBJECT: Draft Environmental Assessment (EA) Addressing a Proposed Mixed-Use Business Park on an Enhanced Use Lease at Grand Forks Air Force Base (AFB), North Dakota

The 319th Air Base Wing (319 ABW) is proposing an Enhanced Used Lease for a Proposed Mixed-Use Business Park at Grand Forks AFB, North Dakota. Grand Forks AFB proposes to lease approximately 217 acres to Grand Forks County for the purpose of developing, constructing and operating a mixed-use business park. The environmental impact analysis process for this proposal is being conducted by USAF and the 319 ABW in accordance with Council on Environmental Quality regulations pursuant to the requirements of the National Environmental Policy Act of 1969. The Draft Environmental Assessment of the proposed Enhanced Use Lease Mixed-Use Business Park is available for review on the Grand Forks AFB web site, <http://www.grandforks.af.mil/library/index.asp>.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the Draft EA and solicit your comments concerning the proposal and any potential environmental concerns you may have. Please provide written comments or information regarding the proposed action and alternatives at your earliest convenience but no later than 30 days from receipt of this letter. The Distribution List of this letter contains a listing of those federal, state, and local agencies that have been contacted. If there are any additional agencies that you feel should review and comment on the proposed activities, please include them in your distribution of this letter and the attached materials.

Please provide any comments or information directly to 319 CES/CEO, 525 Tuskegee Airmen Boulevard, Grand Forks AFB, ND 58205 within 30 days of receipt of this letter. You may also email comments directly to 319ABW.PA@us.af.mil. If members of your staff have any questions, our point-of-contact for the EA is Ms. Diane Strom (319th CES/CEO) who can be reached at 701-747-6394 or by email at diane.strom@us.af.mil. Thank you for your assistance.

Sincerely,

Signature on original

Leslie W. Canarr
Deputy Base Civil Engineer

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

APPENDIX B

**NOTICE OF AVAILABILITY (NOA) PUBLICATION,
PUBLIC/AGENCY COMMENT MATRIX, AND MEMORANDUM OF UNDERSTANDING**

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

Public Notice
United States Air Force

NOTICE OF AVAILABILITY

**Draft Environmental Assessment and
Draft Finding of No Significant Impact/Draft Finding of No Practicable Alternative for the
Proposed Mixed-Use Business Park on an Enhanced Use Lease at
Grand Forks Air Force Base, North Dakota**

Air Mobility Command Headquarters and Grand Forks Air Force Base (AFB) announce the availability of a draft Environmental Assessment (EA) that evaluates the potential environmental impacts of activities associated with the development of a mixed-use business park by Grand Forks County (County) under an Enhanced Use Lease (EUL) on an underutilized, non-excess portion of Grand Forks AFB, North Dakota (ND). Grand Forks AFB proposes to lease approximately 217 acres to the County for the purpose of developing, constructing, and operating a mixed-use business park to support research and development, testing and evaluation, and operations of unmanned aerial systems (UAS), as well as activities centered on the development of sensor technology and data management.

The activities associated with the proposed action include development, construction, and operation of the proposed mixed-use business park upon execution of a 50-year land lease. The proposed action also includes the use of UAS to launch and recover remotely piloted aircraft subject to notice to the County, written request to the Air Force for its review and approval, and compliance with Federal Aviation Administration regulations. The draft EA evaluates the potential impacts of the proposed action and reasonable alternatives to include the no action alternative on air quality, water resources, biological resources, cultural resources, hazardous materials and wastes, geology and soils, land use, noise, transportation, utilities, socioeconomics, environmental justice, and occupational health and safety. The draft EA analyzes the impacts of two proposed alternative layouts of the proposed business park that includes construction in wetlands that will require a Finding of No Practicable Alternative. Alternative 2, the preferred alternative, is a layout designed to reduce impacts on wetlands in the leased area to the maximum extent practicable. The analysis as shown in the EA indicates that the proposed action, under the preferred alternative incorporating the appropriate mitigation measures presented, would not have significant impacts on the environment and would support a Finding of No Significant Impact and Finding of No Practicable Alternative.

A copy of the draft EA has been placed in the Grand Forks Public Library at 2110 Liberty Circle, Grand Forks, ND, and is available online at: <http://www.grandforks.af.mil/library/>

Written comments on the draft EA are invited and will be received for 30 days following the publication of this notice. Comments for consideration by the Air Force on this document should be provided in writing to:

Public Affairs Office
319th Air Base Wing
375 Steen Blvd.
Grand Forks Air Force Base, ND 58205
Or email 319ABW.PA@us.af.mil
Phone: (701) 747-5023

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

Public/Agency Comments and Responses on the Draft EA			
Source	Individual/ Title	Comment	Response
North Dakota Game and Fish Department	Resource Biologist	The North Dakota Game and Fish Department has reviewed this project for wildlife concerns. We do not believe it will have a significant adverse effect on wildlife or wildlife habitat provided any unavoidable destruction or degradation of wetland acres is mitigated in kind.	Wetland mitigation is summarized in the FONSI and Table 2-4; and explained in detail in Chapter 4 and Appendix C. No changes to the EA are necessary.
		The sharp-tailed grouse lek will likely be reestablished elsewhere, however we do ask that impacts to the white lady's slipper be minimized to the extent possible.	Impacts to white lady's slipper will be minimized by conducting a survey prior to construction and avoidance of existing population to the extent practicable (see FONSI, Table 2-4, Chapter 4 and Appendix C). No changes to the EA are necessary.
North Dakota Parks and Recreation Department	Manager, Planning and Natural Resources Division	The proposed project has the potential to negatively impact not only white lady's slipper and sharp-tailed grouse habitat and populations but several grassland and wetland dependent birds. [specific comments noted below].	Adverse impacts to migratory birds are documented in the FONSI, Table 2-3 and Chapter 4. Mitigation measures for these adverse impacts are documented in the FONSI, Table 2-4, Chapter 4 and Appendix C. Chapter 4 notes that principle reason for the decline in some grassland bird species is habitat loss; and notes the amount of land that would be developed is small in comparison to the amount of grassland habitat in the state or on the installation, noting the project area as a whole contains less than 10 percent of the grassland or hay fields on base (DEA p.4-11). The EA further indicates that the USFWS would be consulted if nests are located in the construction area during the preconstruction survey. No changes to the EA are necessary.
		RE: White Lady's Slipper (<i>Cypripedium candidum</i>). This rare orchid should be protected, along with as much prairie habitat that surrounds it.	Impacts to white and yellow lady's slipper will be minimized by conducting a survey prior to construction and avoidance of exiting population to the extent practicable (see FONSI, Table 2-4, Chapter 4 and Appendix C). The Final EA will be amended to indicate that herbicide application will not be conducted in areas where white lady's slipper occurs.
		It appears that the grasslands and wetlands on site are important breeding habitats for a variety of bird species. Disturbance of [sharp-tailed grouse] leks appears to limit reproductive opportunities and may result in regional population declines (Baydack and Hein 1987).	See response to comment 3.

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

Public/Agency Comments and Responses on the Draft EA			
Source	Individual/ Title	Comment	Response
		The loss or degradation of existing wetlands will very likely cause a decline in the sedge wren population.	See response to comment 3.
		Destruction and degradation of the marshes, grasslands, and low-use pastures will also likely result in <i>short-eared owl</i> populations decline in the immediate area.	See response to comment 3.
		Increased use in the area will likely result in <i>Swainson's hawks</i> to abandon nests as they are species that are easily disturbed during nesting season (Biosystems Analysis 1989).	See response to comment 3.
		Loss, degradation, and fragmentation of existing grassland and wetland habitat will also pose a serious threat to breeding birds such as the <i>upland sandpiper</i> , <i>Northern harrier</i> , <i>bobolink</i> , <i>dickcissel</i> , <i>grasshopper sparrow</i> and several other [sic] that have been observed on site.	See response to comment 3. The dickcissel and grasshopper sparrow are not specifically mentioned in Chapter 4 because they are not included in the list of species regularly sited in the project area according to GFAFB Biological Survey. These species are listed in Appendix E (INRMP species list). No changes to the EA are necessary.
Homeowner	Arvilla ND	It is imperative that this Environmental Impact Study include the impact of the "light pollution" associated from this new industrial park on the area homeowners. Further we ask the results of this study mandate in the design of the Grand Sky development to "limit the area and security lighting to the minimal necessary to meet their illumination requirements". [The homeowner noted a different location where a 'home's property and aesthetic value plummeted' after construction of a new Border Control facility directly across the street from the residence.]	The proposed development would include lighting typical of a mixed-use business park. Lighting would be consistent with energy conservation measures and lighting intensity on the installation, including illumination associated with security needs. The closest residence is more than 2,000 ft from the nearest boundary, southeast of the proposed development and toward the more developed portions of the installation. The statement noted above will be added to the Socioeconomic Resources section of Chapter 4 (Section 4.11).
North Dakota Department of Health	Chief Environmental Health Division	This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction measures... and the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.	No changes to the EA are necessary.

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

Public/Agency Comments and Responses on the Draft EA			
Source	Individual/ Title	Comment	Response
		<p>All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are dealt with in an efficient and effective manner.</p>	<p>Fugitive dust control is addressed in Chapter 4 with regard to watering exposed soil (Section 4.1.2.1). The following best management practices would be added to the discussion in Section 4.1.2.1:</p> <p>Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.</p> <p>Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.</p> <p>When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.</p>
		<p>Care is taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site (guidelines attached to the letter).</p>	<p>BMPs to minimize adverse impacts on water quality are noted in Chapter 4 (DEA Section 4.2.2.1, p 4-4, 4-5). The construction and environmental disturbance requirements provided by the ND Department of Health will be added to the discussion in Chapter 4.</p>
		<p>Projects disturbing one or more acres are required to have a permit to discharge stormwater runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Check with local officials to be sure any local storm water management considerations are addressed</p>	<p>Necessary coordination is noted in Chapter 4.</p> <p>No changes to the EA are necessary.</p>
		<p>Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can be minimized by ensuring that construction activities are not conducted during early morning or late evening hours.</p>	<p>The EA notes that the closest house to the development is more than 2,000 feet away from the nearest boundary; therefore construction noise would be minimal.</p> <p>Additional information regarding engineering controls for noise will be added to Chapter 4 (Section 4.8.2) as follows: Additional engineering controls that could be implemented to reduce noise include substituting existing equipment with quieter</p>

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

Public/Agency Comments and Responses on the Draft EA			
Source	Individual/ Title	Comment	Response
		equipment; retrofitting existing equipment with damping materials, or mufflers.	
		The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding issuance of such a certification.	Discussion of necessary 404 permitting and coordination is discussed in Chapter 4. No changes to the EA are necessary.
USFWS Ecological Services	Field Supervisor	No Action. The Fish and Wildlife Service is unable to comment on this project due to funding or staff constraints. This does not constitute a report of the Department of Interior in accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661 et.seq.)	No action required.

**Environmental Assessment for an Enhanced Use Lease
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MEMORANDUM OF UNDERSTANDING

AMONG

THE 319TH AIR BASE WING, GRAND FORKS AIR FORCE BASE,

THE CHEYENNE RIVER SIOUX TRIBE,

THE STANDING ROCK SIOUX TRIBE,

THE SPIRIT LAKE TRIBE,

AND

THE SISSETON-WAHPETON OYATE

**REGARDING THE CONSTRUCTION OF AN AVIATION AND MIXED-USE
BUSINESS PARK AT GRAND FORKS AFB**

WHEREAS, the United States Air Force, represented by 319TH Air Base Wing (319 ABW) operates and maintains Grand Forks AFB (GFAFB) and has the authority under 10 U.S.C. § 2667 to lease property that is not presently needed for public use; and

WHEREAS, Grand Forks County (GFC) has submitted a proposal to lease 217 acres of GFAFB to develop that area as an Aviation and Mixed-Use Business Park; and

WHEREAS, 319 ABW is responsible for identifying and managing historic properties at GFAFB and identifying and considering effects of any undertakings to historic properties pursuant to Section 106 of the National Historic Preservation Act (NHPA) (16 USC § 470f) and its implementing regulation, 36 CFR Part 800; and

WHEREAS, 319 ABW has defined the undertaking's area of potential effect (APE) as the 217 acres shown on the map in Attachment A; and the APE was inventoried as part of the *Grand Forks AFB Cultural Resources Survey, Class III Intensive Archaeological Inventory*, September 1996, which found no evidence of Native American remains or properties of religious and cultural significance on GFAFB; and during the inventory; and the Three Affiliated Tribes of the Fort Berthold Reservation, the Spirit Lake Tribe (Fort Totten Reservation), the Standing Rock Sioux Tribe, and the Turtle Mountain Band of Chippewa Indians were contacted, but these tribes did not identify any properties of religious and cultural significance on Grand Forks AFB; and

WHEREAS, the Cheyenne River Sioux Tribe, Standing Rock Sioux Tribe, Spirit Lake Tribe, and Sisseton-Wahpeton Oyate (Tribes) have requested an opportunity to survey the 217

acre site as weather conditions permit; and

WHEREAS, 319 ABW has fulfilled its obligations under NHPA Section 106 by concluding consultation with the North Dakota State Historic Preservation Office (SHPO) who concurred by letter dated 1 Nov 2013 that no historic properties would be affected; and

NOW, THEREFORE, 319 ABW, the Cheyenne River Sioux Tribe, the Standing Rock Sioux Tribe, the Spirit Lake Tribe, the Sisseton-Wahpeton Oyate, and any tribes that may later be added pursuant to Stipulation V.B below, agree that the undertaking shall be implemented in accordance with the following stipulations.

STIPULATIONS

I. PRE-CONSTRUCTION ACTIVITIES

A. Identifying Traditional Cultural Properties of Religious and Cultural Significance.

i. 319 ABW will provide access to the APE and allow the Tribes to conduct their own Traditional Cultural Property (TCP) survey prior to 15 May 2014. This survey gives the Tribes an opportunity to identify any properties of religious and cultural significance to them that may be present in the APE.

ii. The TCP survey will be conducted by Tribal representatives. The Tribes will designate their representatives, or determine who will conduct the survey on their behalf. The 319 ABW will assist the Tribe by providing personnel to map TCP features and boundaries as identified by Tribal representatives. 319 ABW personnel will enter the geographic data into a GIS system capable of rendering maps, but will not include descriptions of the TCPs, only their locations. Digital maps may be reviewed by the Tribes and 319 ABW on laptop computers equipped with appropriate software, if available. Printed maps will be produced for quality assurance and quality control purposes upon request by and for use by Tribal representatives. It will be the responsibility of the Tribes to document descriptions of observed TCPs in field notes, photographs, and/or sketches or by other means selected by the Tribes.

iii. If TCP locations are identified, the Tribal representatives will notify Tribal Elders at least one day prior to the last day of the survey, so that the Tribal Elders, if participating, can travel to the 217 acre site (or portion thereof) to participate in the survey. The Tribal representatives may revisit the locations of TCPs, if any, with the Tribal Elders as desired.

iv. 319 ABW will, upon completion of the survey, provide to the Tribes one CD or DVD containing the digital files for all mapped TCPs and buffers, if any. 319 ABW may retain data in its GIS system for project planning purposes (i.e., to provide a basis for

avoiding impacts to TCPs through micrositing) and share this information with Grand Forks County and its sublessees. The Tribes will identify what data on the CD or DVD, if any, they desire 319 ABW to withhold from public release. Such data will not be shared with the public, and is exempt from release under the Freedom of Information Act under exemption 3 and National Historic Preservation Act Section 304 (16 U.S.C. § 470w-3).

B. Evaluating Eligibility of TCPs for the National Register.

i. 319 ABW shall consider the information developed by the TCP survey, as well as any supplemental information provided by the Tribes, and shall apply 36 CFR § 60.4 criteria to determine whether any sites identified by the Tribes are eligible for listing on the National Register of Historic Places (NRHP). 319 ABW acknowledges and will take into account the special expertise of the Tribes for the identification and NRHP-eligibility assessment of TCPs that may possess religious and cultural significance to them.

ii. Any TCPs that 319 ABW, the Tribes, and SHPO agree meet 36 CFR § 60.4 criteria shall be considered eligible for the NRHP.

iii. If 319 ABW and the SHPO do not agree on an eligibility determination, or if the ACHP or the Secretary of the Interior so request, 319 ABW shall obtain a determination of eligibility from the Keeper of the NRHP pursuant to 36 CFR § 800.4(c)(2). If practicable, 319 ABW will instruct GFC to avoid start of construction at any site for which the Keeper's determination is pending, but the parties agree that construction may start if necessary to meet project schedules.

C. Avoiding and Mitigating Adverse Effects on NRHP-Eligible Properties.

i. 319 ABW shall determine whether the undertaking will have an adverse effect for each site found eligible for the National Register pursuant to Stipulation I.B above. 319 ABW will advise the Tribes of the determination. If any Tribe disagrees with the determination, it may within 30 days request the ACHP to review the finding.

ii. 319 ABW, in consultation with the SHPO and Tribes, shall ensure that adverse effects to properties determined to be eligible for listing in the NRHP shall be avoided whenever prudent and practicable.

iii. If it is not practicable to avoid adversely affecting a TCP that is eligible for listing on the NRHP, 319 ABW shall consult with the SHPO and Tribes to identify measures to resolve adverse effects pursuant to 36 CFR § 800.6 including, if necessary, the development of a data recovery plan for treatment of TCPs affected by the undertaking.

D. Information received after start of construction. The parties expect that the Tribes will be able to complete a TCP survey on the 217 acre parcel no later than 15 May 2014. 319

ABW will consider all available information, including that in a TCP survey or provided by the Tribes, when making decisions on eligibility, avoidance, and mitigation in accordance with paragraphs B and C above. Nevertheless, the parties agree that 319 ABW is not required to alter construction plans and schedules as a consequence of information received after start of construction (except for information relating to the unexpected discovery of archaeological materials, human remains, or associated funerary objects as described in Stipulation II.A below). When information is received after start of construction, 319 ABW will consult with the Tribes to explore ways to minimize impacts that will not impact construction plans and schedules.

II. CONSTRUCTION RELATED ACTIVITIES

A. Unexpected Discovery of Human Remains or Associated Funerary Objects. 319 ABW has no information indicating human remains or associated funerary objects are present in the APE. However, if such materials are discovered during construction, 319 ABW, GFC, and its sublessees shall stop construction in the immediate area of the discovery and notify the North Dakota State Department of Health and Consolidated Laboratories, Grand Forks County Sheriff's Office and the SHPO. Remains will be treated with respect to the deceased, and shall be protected, upon discovery, from further construction activities pending consultation to resolve treatment of such remains.

i. All human remains are to be considered Native American, until such time they are determined otherwise. If human remains are discovered, 319 ABW will notify the Tribes and other Federally recognized tribes affiliated with Grand Forks AFB. In accordance with Section 3(d)(1) of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. § 3002(d)(1)), construction may resume 30 days after the tribes certify that they have received notification.

ii. Whenever possible, Native American human remains and funerary objects will be preserved in place. When human remains and associated funerary objects cannot remain in place, disposition will comply with NAGPRA, 25 U.S.C. 3001 et seq., and implementing regulations at 43 CFR Part 10.

B. Unexpected Discovery of Archaeological Materials. If archaeological materials are discovered during construction, 319 ABW shall, pursuant to 36 CFR §800.13(b), make reasonable efforts to avoid, minimize, or mitigate adverse effects to such materials if found on a site that is eligible for the National Register. 319 ABW shall notify the SHPO, ACHP, the Tribes, and other Federally recognized tribes affiliated with Grand Forks AFB within 48 hours of the discovery.

III. CONFIDENTIALITY. 319 ABW acknowledges the need for confidentiality for certain tribal spiritual and cultural information. Pursuant to 36 CFR §§ 800.2(c)(2)(ii)(E), information provided by the Tribes or their members and identified as culturally sensitive will be kept confidential and be protected from public disclosure to the extent permitted by state and Federal law.

IV. DURATION

This MOU shall be in effect from the date executed by all parties until the end of the 10 year construction period, or any authorized extension of the construction period. Prior to such time, 319 ABW may consult with the other parties to reconsider the terms of the MOU and amend it in accordance with Stipulation V below.

V. AMENDMENTS

A. This MOU may be amended when such an amendment is agreed to in writing by all parties. The amendment will be effective on the date of the last signature and shall be appended to this MOU as an attachment.

B. Additional tribes may be added as parties to this MOU without amendment if 319 ABW notifies all existing parties in writing of the proposal and there is no objection from any existing party within thirty (30) days of 319 ABW's written notice. If no response is received within thirty (30) days of mailing, 319 ABW may assume concurrence with the addition of the tribe(s) to this MOU.

VI. WITHDRAWAL

If any party to this MOU determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation V, above. If within thirty (30) days (or another time period agreed to by the parties) an amendment cannot be reached, that party may withdraw from the MOU upon written notification to the other parties. The MOU will remain in effect among the remaining parties.

PARTIES:

319TH AIR BASE WING, GRAND FORKS AIR FORCE BASE

By: _____ Date: _____

**PAUL E. BAUMAN, Colonel, USAF
Commander**

CHEYENNE RIVER SIOUX TRIBE

By: _____ Date: _____
KEVIN KECKLER, Chairman

SISSETON-WAHPETON OYATE

By: _____ Date: _____
ROBERT SHEPHERD, Chairman

SPIRIT LAKE TRIBE

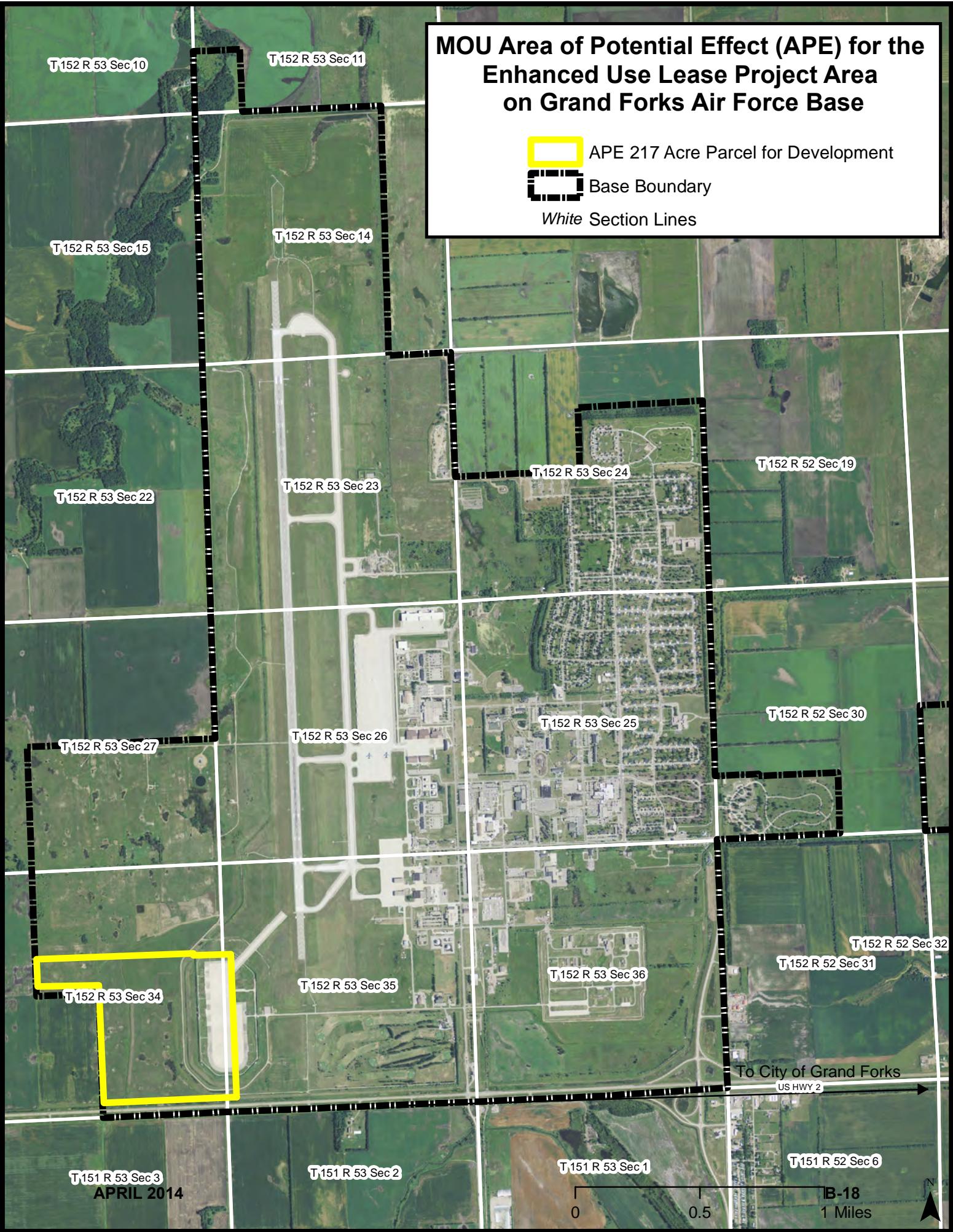
By: _____ Date: _____
ERICH LONGIE, Tribal Historic Preservation Officer

STANDING ROCK SIOUX TRIBE

By: _____ **Date:** _____
DAVE ARCHAMBAULT II, Chairman

MOU Area of Potential Effect (APE) for the Enhanced Use Lease Project Area on Grand Forks Air Force Base

 APE 217 Acre Parcel for Development
 Base Boundary
White Section Lines



APPENDIX C

MITIGATION PLAN

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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APPENDIX C

MITIGATION PLAN

1.0 INTRODUCTION

This mitigation plan was prepared to support the EA, FONSI, and FONPA for the proposed action. The development plans used to assess the impacts of the proposed action are preliminary depictions of potential layouts of the business park; however, these plans are preliminary and may be modified as the needs of actual tenants are identified. Before any changes can be made to the requirements in this mitigation plan, the County will present the plans to the base Civil Engineer for review. If the impact on jurisdictional wetlands exceeds 0.5 acres, the County will support the Air Force in applying for a Clean Water Act Section 404 permit from the US Army Corps of Engineers (USACE).

1.1 PROPOSED ACTION

GFAFB has prepared an EA to evaluate the potential environmental impacts of activities associated with the development of a mixed-use business park by County under the US Air Force EUL Program on a 217-ac underutilized, non-excess portion of GFAFB, ND.

The activities associated with the proposed action include development, construction, and operation of the proposed mixed-use business park upon execution of a 50-year land lease. The proposed action also includes the use of unmanned aerial systems to launch and recover remotely piloted aircraft subject to written notice to the County, written request to the Air Force for its evaluation, review, and approval including Air Force conditions and restrictions, and compliance with Federal Aviation Administration (FAA) regulations. The EA evaluates the potential impacts of two action alternatives to the proposed action and the no action alternative on air quality, water resources, biological resources, cultural resources, hazardous materials and wastes, geology and soils, land use, noise, transportation, utilities, socioeconomic, environmental justice, and occupational health and safety.

1.2 WETLANDS IN THE PROJECT AREA

Wetlands on GFAFB occur frequently in drainage ways, low-lying depressions, and potholes. Previous wetland assessments conducted at GFAFB include a wetland identification and delineation from 1999, a site-wide wetland assessment and summary in 2004, a site-specific wetland delineation of the new proposed fire station area in 2005, a selected wetland delineation in 2006, a wetlands characterization project in 2007, a wetland inventory and assessment in 2011, and two project/site-specific wetland delineations conducted in 2012. All of these efforts have been compiled into comprehensive GIS files.

Due to the presence of potential wetland features, wetland delineation was conducted for the entire project area. The wetland delineation report *Wetland Delineation Final Report Proposed Mixed-Use Business Park on an Enhanced Use Lease at Grand Forks Air Force Base, North Dakota*, August 2013, was submitted to the USACE with a request to verify results and determine whether the features identified in the report as wetlands or waters of the US would fall under USACE jurisdiction and be subject to a CWA 404 permit for any the discharge of dredged or fill material into waters of the US. The Wetland Delineation report and the USACE Jurisdictional Determination is included in **Appendix D of the EA**.

Wetland delineation field surveys were conducted on the 217-ac project area in June and July 2013. The resulting effort identified 32 wetlands totaling 23.795 ac within the project boundary (**Figure 3-1 of the EA**). Of the 23.795 ac of wetlands delineated, 11 wetlands totaling 14.069 ac exhibited a physical connection to wetlands that had been identified as jurisdictional in previous studies (GFAFB 2012) and eventually connected to downstream traditional navigable waters. No physical connection to other wetlands or traditional navigable waters was observed for the remaining 21 wetlands mapped in the project area that totaled 9.726 ac. The table below summarizes the results of the USACE jurisdictional determination. All 32 wetlands within the project area were categorized as palustrine emergent wetlands (GMI 2013).

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Table C-1. Results of wetland jurisdictional determination

	Number	Acreage
Jurisdictional	11	14.069
Isolated	21	9.726
Total	32	23.795

1.3 LEGAL AND REGULATORY REQUIREMENTS

The Air Force has determined that the proposed action involving the County and its representatives has the potential to cause direct impacts to wetlands at GFAFB. This Mitigation Plan is intended to help the Air Force ensure and manage compliance with the mandates of several laws, regulations, EOs, and DOD Instructions (DODIs) to include oversight of the proposed project activities by the County and its representatives in wetlands.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the USACE, to issue permits for the discharge of dredged or fill material into waters of the US, including wetlands. Waters of the US (33 CFR Section 328.3[a]) are those waters used in interstate or foreign commerce, subject to ebb and flow of tide, and all interstate waters including interstate wetlands.

Traditional navigable waters and their adjacent wetlands are jurisdictional (USEPA 2007). Likewise, non-navigable tributaries of traditional navigable waters that are relatively permanent waters and typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), as well as wetlands that directly abut such tributaries are jurisdictional. In general, seasonal relatively permanent waters are synonymous with intermittent and year-round relatively permanent waters with perennial stream systems.

EO 11990, Protection of Wetlands, requires federal agencies to minimize the destruction, loss or degradation of wetlands, both jurisdictional and non-jurisdictional, and preserve and enhance the natural and beneficial values of wetlands. It also requires that agencies avoid construction, or providing financial assistance for new construction, located in wetlands to the extent practicable. When actions cannot completely avoid adverse effects on wetlands, the Federal agency must prepare a FONPA and obtain all applicable and appropriate permits from the authorized regulatory agencies and follow required mitigation measures when necessary.

DODI 4715.03 establishes policy for compliance with applicable federal, state, and local statutory and regulatory requirements, EOs, Presidential memorandums, and other DOD policies for the integrated management of natural resources including lands, air, waters, coastal, and near shore areas managed or controlled by DOD.

According to the Instruction, the principal purpose of DOD lands, waters, airspace, and coastal resources is to support mission-related activities. Natural resources conservation programs must guarantee DOD continued access to its land, air, and water resources for realistic military training and testing. DOD installations must also demonstrate stewardship of natural resources in their trust by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services. The lands, waters, airspace, and coastal resources must be managed for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.

DOD components, such as GFAFB, are directed to use a watershed-based approach to manage operations, activities, and lands so as to avoid or minimize impacts to wetlands, groundwater, and surface waters on or adjacent to installations. With respect to wetlands, DODI 4715.03 states the following:

- (1) DOD components shall ensure no net loss of size, function, and value of wetlands, and will preserve the natural and beneficial values of wetlands in carrying out activities in accordance with EO 11990

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and the White House Office on Environmental Policy *Protecting America's Wetlands: A Fair, Flexible, and Effective Approach*, issued 24 August 1993.

- (2) When avoidance of wetlands and other waters of the US is not practicable, and impacts have been minimized, participation in an approved off-site mitigation bank or in-lieu fee instrument is encouraged as sound conservation planning. Off-site mitigation may provide a preferred alternative to meet watershed protection and ecosystem goals and meet future mission requirements. The enhancement, creation, or restoration of wetlands or streams on DOD property may also be an acceptable means for mitigating mission impacts on wetlands.
- (3) In the event that discharges of pollutants into wetlands or other US waters are necessary, DOD installations must obtain appropriate permits and complete mitigation.

1.4 SUMMARY OF MITIGATION FROM THE ENVIRONMENTAL ASSESSMENT

Table C-2 is a summary of the mitigation measures identified in the EA. These mitigation are described more fully in the sections below.

Table C-2. Summary of project features that mitigate environmental consequences

Potential Impact	Mitigation Measures by Grand Forks County
Water Resources	
<ul style="list-style-type: none"> Avoid degradation of water quality from project construction activities 	<ul style="list-style-type: none"> Obtain coverage under ND's NPDES General Permit for Stormwater Discharge Associated with Construction Activities Prepare and follow a site-specific Storm Water Pollution Prevention Plan
<ul style="list-style-type: none"> Avoid or minimize disturbance or loss of wetlands in project area 	<ul style="list-style-type: none"> Reduce and relocate building footprints within project area to avoid as many ac of wetlands as practicable During construction, flag/stake wetland boundaries to keep workers from disturbing wetlands Mitigate for wetland loss by enhancing an existing wetland or wetlands within the project boundaries. Obtain a CWA Section 404 permit (with cooperation from GFAFB) from the USACE. Comply with mitigation measures required by the USACE in their CWA Section 404 permit
<ul style="list-style-type: none"> Comply with stormwater management requirements under Section 438 of the EISA 	<ul style="list-style-type: none"> Use low-impact development techniques to maintain the pre-construction hydrology
<ul style="list-style-type: none"> Comply with North Dakota Department of Health Construction and Environmental Disturbance Requirements 	<ul style="list-style-type: none"> Prevent erosion of exposed soil surfaces and trapping sediments being transported. Control stream bank and stream bed disturbances to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. Coordinate use of pesticides or herbicides with those accepted for use by GFAFB on the installation Fill placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds. Debris and solid waste will be properly removed and impacted areas restored as nearly as possible to the original condition.
Biological Resources	
<ul style="list-style-type: none"> Potential impact on migratory birds that lay over or nest in project area 	<ul style="list-style-type: none"> If practicable, time construction in the grassland area to avoid the primary nesting season April 15 to July 15 (Migratory Bird Treaty Act and the INRMP)

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

Table C-2 (continued). Summary of project features that mitigate environmental consequences.

Potential Impact	Mitigation Measure
Biological Resources	
	<ul style="list-style-type: none"> To avoid construction delays, conduct preconstruction surveys to look for and avoid any nesting grassland birds or bald eagles (in trees). If nests are located in the area, consult with USFWS for mitigation Maintain native prairie/grassland in areas of the lease that do not need to be disturbed until later phases of construction Reseed disturbed grassland areas as soon as possible with native grassland seed mixes
<ul style="list-style-type: none"> Potential impact on populations of lady's slipper orchids documented in the northwest corner of the project area 	<ul style="list-style-type: none"> Before preparing the plans for development of the northwestern-most parcel of the project area, conduct surveys for white and yellow lady's slipper orchids and avoid disturbing the existing population to the maximum extent practicable Herbicide application will not be conducted in areas where white or yellow lady's slipper occurs
Cultural Resources	
<ul style="list-style-type: none"> If cultural resources are discovered during construction 	<ul style="list-style-type: none"> Halt construction and immediately notify the GFAFB EUL Project Coordinator and/or Cultural Resources Manager of the discovery in order to accurately identify and assess the discovery and to generate appropriate responses based on applicable federal laws, regulations and policies Follow stipulations of the MOU between affected Tribes and the Air Force, provided the MOU is applicable to the assessed cultural resources discovery
Hazardous Materials and Waste	
<ul style="list-style-type: none"> Use of hazardous materials and generation of hazardous wastes at the business park by the County or tenants 	<ul style="list-style-type: none"> Prepare a Hazardous Waste Management Plan that would stipulate the processes and procedures for managing, transporting, handling, storing, treating and disposing of hazardous materials and/or hazardous waste and substances generated within the business park activities
<ul style="list-style-type: none"> Grand Forks County has an average indoor radon screening level above the USEPA radon guideline of 4 pCi/L. 	<ul style="list-style-type: none"> Buildings to be designed to reduce radon penetration to the interiors.
Transportation	
<ul style="list-style-type: none"> Potential change in traffic patterns 	<ul style="list-style-type: none"> Ensure that NDDOT adds turn lanes to US-2 at the entrance to the development to prevent potential traffic slowdowns on the highway
Utilities	
<ul style="list-style-type: none"> Impacts due to increased utility usage 	<ul style="list-style-type: none"> Design and construct buildings to meet the requirements for LEED Silver certification and incorporate as many energy and water conservation initiatives as practicable

ND=North Dakota; NPDES=National Pollutant Discharge Elimination System; GFAFB=Grand Forks Air Force Base; USACE=United States Army Corps of Engineers; EISA=Energy Independence and Security Act; INRMP=Integrated Natural Resources Management Plan; USFWS=United States Fish and Wildlife Service; EUL=Enhanced Use Lease; MOU=Memorandum of Understanding; USEPA=US Environmental Protection Agency; pCi/L=picoCuries per liter; NDDOT=North Dakota Department of Transportation; LEED=Leadership in Energy and Environmental Design

2.0 WETLAND MITIGATION

If there appear to be impacts on wetlands as a result of the proposed action, both USACE and the Air Force recommend a three-tiered approach to mitigating the impacts:

- Avoidance
- Minimization
- Replacement or Compensation

2.1 AVOIDANCE

After completion of the wetland delineation in July 2013, the County redesigned their business park conceptual layout to avoid as many jurisdictional and non-jurisdictional wetlands as practicable. The redesigned layout will avoid 91.3 percent of the wetlands, jurisdictional and isolated, that would be lost by the initial layout.

Because the layout plan submitted for Alternative 2 is conceptual and subject to change, the Air Force is evaluating the impacts of up to 1 acre of jurisdictional wetland permanent impact and 1 acre of isolated wetland permanent impact, and the potential temporary construction impacts around the permanent structures.

2.2 MINIMIZATION

If impacts to wetlands cannot be completely avoided, minimization of impacts on wetlands is the next step in mitigating impacts on wetlands. Implementation of the following BMPs, where appropriate, would minimize potential for impacts on wetlands that are adjacent to proposed activities. These BMPs include construction controls and natural resources controls:

Table C-3. Impacts on wetlands for both original layout and revised layout

	Alternative 1	Alternative 2	Reduction of Impact
Permanent Impacts on Wetlands			
Permanent impacts on jurisdictional wetlands (excluding culverts)	4.430	0.0346	99.2%
Permanent impacts on jurisdictional wetlands from culvert placement	0.2445	0.2789	-14.1% (gain)
Permanent impacts on isolated wetlands	5.556	0.4964	91.1%
Total permanent impacts on wetlands (jurisdictional, isolated, and culverts)	10.23	0.8109	91.3%
Temporary Impacts on Wetlands			
Temporary impacts on jurisdictional wetlands	1.152	0.4695	59.2%
Temporary impacts on jurisdictional wetlands from culvert placement	0.2340	0.2685	-14.7% (gain)
Temporary impacts on isolated wetlands	2.807	0.8092	71.2%
Total temporary impacts on wetlands (jurisdictional, isolated, and culverts)	4.194	1.547	63.1%
Number of culverts	6	7	+1

- The wetlands will be clearly flagged prior to commencement of construction activities. This will restrict construction workers from entering these wetlands and potentially placing fill within the wetlands or trampling wetland vegetation.
- Obtain coverage under North Dakota's NPDES General Permit for Stormwater Discharge Associated with Construction Activities; and develop and implement a SWPPP to prevent surface water degradation of wetlands
- Silt fences will be installed along wetland boundaries down gradient of the construction site. The silt fences will be maintained fully functional and will not be removed until disturbed areas are stabilized by seeding, natural establishment or other means necessary.
- Clearing and grubbing will be timed with construction to minimize the exposure of cleared land surfaces. Such activities will not be conducted during periods of significant precipitation. This would result in less soil exposed at one time, and will reduce the potential for erosion and deposition of sediment into wetlands.
- Wetland soils that must be removed from wetland areas to facilitate construction activities will be stored in a shaded location and protected from the wind. These wetland soils will be kept moist to maintain a viable seed bank for replacement in the wetland for restoration activities. When construction in the area is complete, the topography will be returned to pre-construction elevations and wetland vegetation will be replanted. If required by the USACE permit, the replanted wetlands will be monitored for successful viability.
- When wetland crossings cannot be avoided, the use of heavy machinery in wetlands will be minimized by using access paths located along high ground with appropriate mats, docks, or boardwalks as applicable rather than placing fill into a wetland to facilitate crossing.
- Vegetation disturbance will be minimized to the maximum extent practicable. Limits of work will be established that restrict construction equipment to the narrow corridor necessary for that activity. Vegetation outside the site footprint and beyond the limit of work will be protected.
- Disturbed areas will be seeded with native wetland or grassland seed mixes as soon as possible after construction activities in an area are completed.
- Final grading will be free of ruts or ditches caused by equipment.

2.3 REPLACEMENT

If wetland impacts still exist following avoidance and minimization, the USACE preference for replacement or compensation is to enhance existing wetlands within the project area using a one-to-one replacement ratio. The two largest wetlands that are avoided in the conceptual plan for Alternative 2 would be appropriate locations for mitigation enhancement of the wetlands. The County will enlarge either of these wetlands under provisions made in the USACE permit.

3.0 MAINTENANCE OF HYDROLOGY

Section 438 of the EISA requires that natural hydrology be maintained or restored to the maximum extent technically feasible. Predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology would be calculated and site design would incorporate stormwater retention and reuse technologies to the maximum extent technically feasible. Post-construction analyses would be conducted to evaluate the effectiveness of the as-built stormwater reduction features. Some of the construction BMPs that the County will use to help to maintain site hydrology include:

- Existing drainage ways will be preserved to the maximum extent practicable. Water will not be diverted away from or towards wetlands and other waters of the United States.
- The County will coordinate with the Air Force to obtain coverage under North Dakota's NPDES General Permit for Stormwater Discharge Associated with Construction Activities.
- Maximum infiltration and minimum concentrated flow will be provided to the maximum extent practicable by using low impact development ideas such as permeable pavement, bioswales, rain gardens, and/or other retention features.

4.0 OTHER BEST MANAGEMENT PRACTICES

4.1 MIGRATORY BIRDS AND HABITAT

In addition to the on-site wetlands, the project site consists of a mix of warm and cool season grasses and noxious weeds. The grasslands are important habitats for migrating and breeding birds. One of the main focuses of wildlife management at GFAFB is habitat improvement. Much of the project site has been included in attempts to restore native prairie habitats on base. Although over the period of development 217 ac of grassland and wetland would be adapted in and around the business park, certain actions to minimize the adverse effects on grassland species will be performed. These include:

- If practicable, time construction in the grassland area to avoid the primary nesting season April 15 to July 15
- If land clearing needs to be conducted within this time period, conduct preconstruction surveys to look for and avoid any nesting grassland birds
- Maintain native prairie/grassland in areas of the lease that do not need to be disturbed until later phases of construction
- Reseed disturbed grassland areas as soon as possible with native grassland seed mixes approved by the GFAFB Natural Resources Manager
- Control the spread of noxious weeds by avoiding heavy equipment activities in or adjacent to heavily infested areas.
- Exposed soil should be covered to reduce the germination of weed seeds, maintain soil moisture, and minimize erosion. If mulch or coverage is needed to minimize soil erosion, cover the area with weed-seed-free mulch or hay.

Many of the mitigation measures to minimize impacts on wetlands will be followed for grassland protection also. Vegetation disturbance will be minimized to the maximum extent practicable. Limits of work will be established that restrict construction equipment to the narrow corridor necessary for that activity. Vegetation outside the site footprint and beyond the limit of work will be protected.

4.2 CULTURAL RESOURCES

As required in the Integrated Cultural Resources Management Plan, in the unlikely event any artifacts are discovered during the construction activities, the operator will be instructed to halt construction and immediately notify the GFAFB EUL Project Coordinator and/or Cultural Resource Manager of the discovery, and stipulations of the MOU between affected Tribes and the Air Force, if deemed applicable to the identified discovery will be followed. The MOU can be found in **Appendix B**. Based on the identified discovery, other applicable federal laws and regulations may be applicable; therefore, immediate notification to the Air Force is important and necessary.

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

4.3 BUILDING REQUIREMENTS

The County will design and construct buildings to LEED certifiable standards and incorporate as many energy and water conservation initiatives as practicable. In addition, the design of the buildings will take into account that Grand Forks County has predicted average indoor radon screening level above the USEPA radon guideline of 4 pCi/L and include radon-reducing measures, as appropriate.

4.4 TRAFFIC REQUIREMENTS

The County will conduct a traffic study prior to occupation of the business park. According to the Draft 2014-2017 North Dakota Statewide Transportation Improvement Plan, the NDDOT has plans to make the turn lane modifications on US-2 in this area in Fiscal Year 2014. If the traffic study shows the need, the County will coordinate with NDDOT to get turn lanes installed to reduce traffic impacts.

5.0 CONCLUSIONS

The mitigation measures and BMPs in this plan will be followed to the maximum extent practicable. Any changes in the methods for mitigating impacts resulting from the business park development will be coordinated with the base Civil Engineer. The use of these or similar mitigation measures will reduce the impacts of the proposed business park development to less than significant.

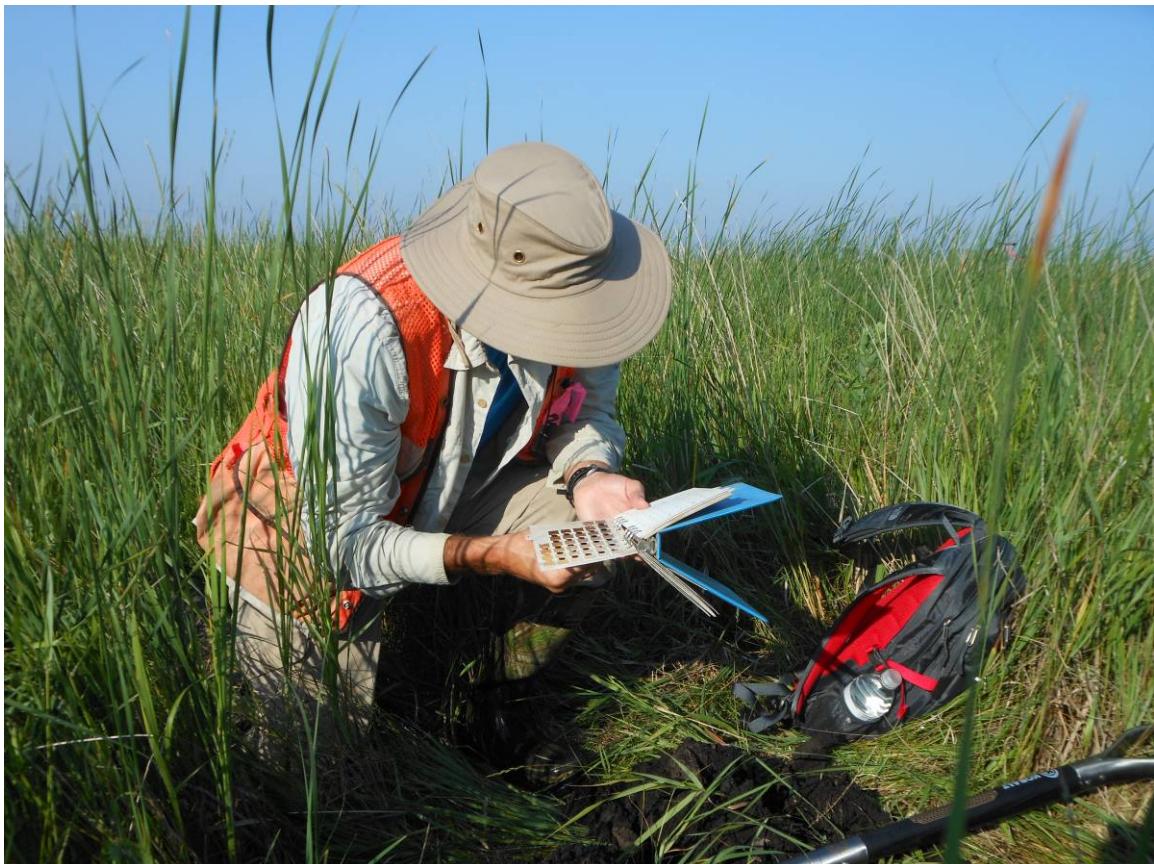
APPENDIX D

**UNITED STATES ARMY CORPS OF ENGINEERS (USACE)
WETLAND JURISDICTIONAL DETERMINATION**

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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**Proposed Mixed-Use Business Park on an Enhanced Use Lease
at Grand Forks Air Force Base, North Dakota
Wetland Delineation Final Report**



319th Air Base Wing
Grand Forks Air Force Base, North Dakota

November 2013

Final

WETLAND DELINEATION REPORT

for the

PROPOSED MIXED-USE BUSINESS PARK ON AN ENHANCED USE LEASE AT GRAND FORKS AIR FORCE BASE, NORTH DAKOTA

Prepared for:

319th Air Base Wing

Grand Forks Air Force Base, North Dakota

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November 2013

EXECUTIVE SUMMARY

Preliminary surveys indicated potential waters of the United States (US) are found within the project area. To comply with Section 404 of the Clean Water Act, field surveys were conducted from 10 to 13 June 2013 and 08 to 14 July 2013. The resulting effort identified 32 wetland polygons totaling 23.795 acres (ac) of wetlands within the project boundary. Of the 23.795 ac of wetlands delineated, 21 wetland polygons totaling 9.726 ac have no physical connection to downstream traditional navigable waters. These results must be verified by the US Army Corps of Engineers (USACE), which has the authority to provide a Jurisdictional Determination upon request.

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	degree(s) Fahrenheit
ac	acre(s)
BASH	bird aircraft strike hazard
CFR	Code of Federal Regulations
CI	confidence interval
CWA	Clean Water Act
DOD	Department of Defense
DODI	Department of Defense Instruction
EO	Executive Order
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
ft	foot(feet)
GFAFB	Grand Forks Air Force Base
GIS	geographic information system
GMI	Geo-Marine, Inc.
GP	Great Plains
GPS	global positioning system
in	inch(es)
INRMP	Integrated Natural Resources Management Plan
mi	mile(s)
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWS	National Weather Service
OHWM	ordinary high water mark
P.L.	Public Law
PEM	palustrine emergent
RPW	relatively permanent water
SBAS	Satellite-based Augmentation System
spp.	species
SWANCC	Solid Waste Agency of Northern Cook County
TNW	traditional navigable water
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey

1.0 INTRODUCTION

1.1 PROPOSED PROJECT

Jeffrey Donohoe Associates, LLC contracted Geo-Marine, Inc. (GMI) to conduct a waters and wetlands of the United States (US) delineation on 217 acres (ac; project area; **Figure 1**) on Grand Forks Air Force Base (GFAFB). Grand Forks County proposes to lease the project area from GFAFB for the purpose of developing, constructing, and operating a mixed-use business park.

1.2 PURPOSE AND NEED

This delineation report is intended to assist the County in designing the business park around the wetlands and as a supporting document for the Air Force to submit to the US Army Corps of Engineers (USACE) with their request for a Jurisdictional Determination. It documents the location of all wetlands and waters within the proposed project area, and makes a preliminary assessment of those that are potentially jurisdictional.

The primary objectives of this report are:

1. Provide an overview of the project;
2. Provide an overview of the definition of waters of the US and Executive Order (EO) 11990 (*Protection of Wetlands*), as it pertains to this study;
3. Detail the methods and approach used to assess the project area and delineate wetlands and waters of the US within the project area;
4. Provide detailed mapping of the wetlands identified in the project area (see **Figures 5 through 10**); and
5. Provide a detailed description of the wetlands and waters of the US as delineated during the field work.

2.0 REGULATORY BACKGROUND

2.1 SECTION 404 OF THE CLEAN WATER ACT

Section 404 of the Clean Water Act (CWA) of 1977 (Public Law [P.L.] 95-217) authorizes the Secretary of the Army, acting through the USACE, to issue permits for the discharge of dredged or fill material into waters of the US, including wetlands. Waters of the US (Section 328.3[2] of the CWA) are those waters used in interstate or foreign commerce, subject to ebb and flow of tide, and all interstate waters including interstate wetlands (Environmental Laboratory 1987).

Traditional navigable waters (TNWs) and their adjacent wetlands are jurisdictional. Likewise, non-navigable tributaries of TNW that are relatively permanent waters (RPWs) and typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), as well as wetlands that directly abut such tributaries are jurisdictional. In general, a seasonal RPW is synonymous with intermittent and a year-round RPW with perennial stream systems.

In accordance with applicable USACE and US Environmental Protection Agency (USEPA) guidance, each wetland, tributary, and other waters in the project area was evaluated to determine jurisdiction under the CWA (P.L. 92-500). The Summary Points of the Draft Guidance on Identifying Waters Protected by the CWA (USACE-EPA 2011), excerpted below, were used to provide an opinion of jurisdictional standing.

“Based on the agencies’ interpretation of the statute, implementing regulations and relevant case law, the following waters are protected by the Clean Water Act:

- Traditional navigable waters
- Interstate waters

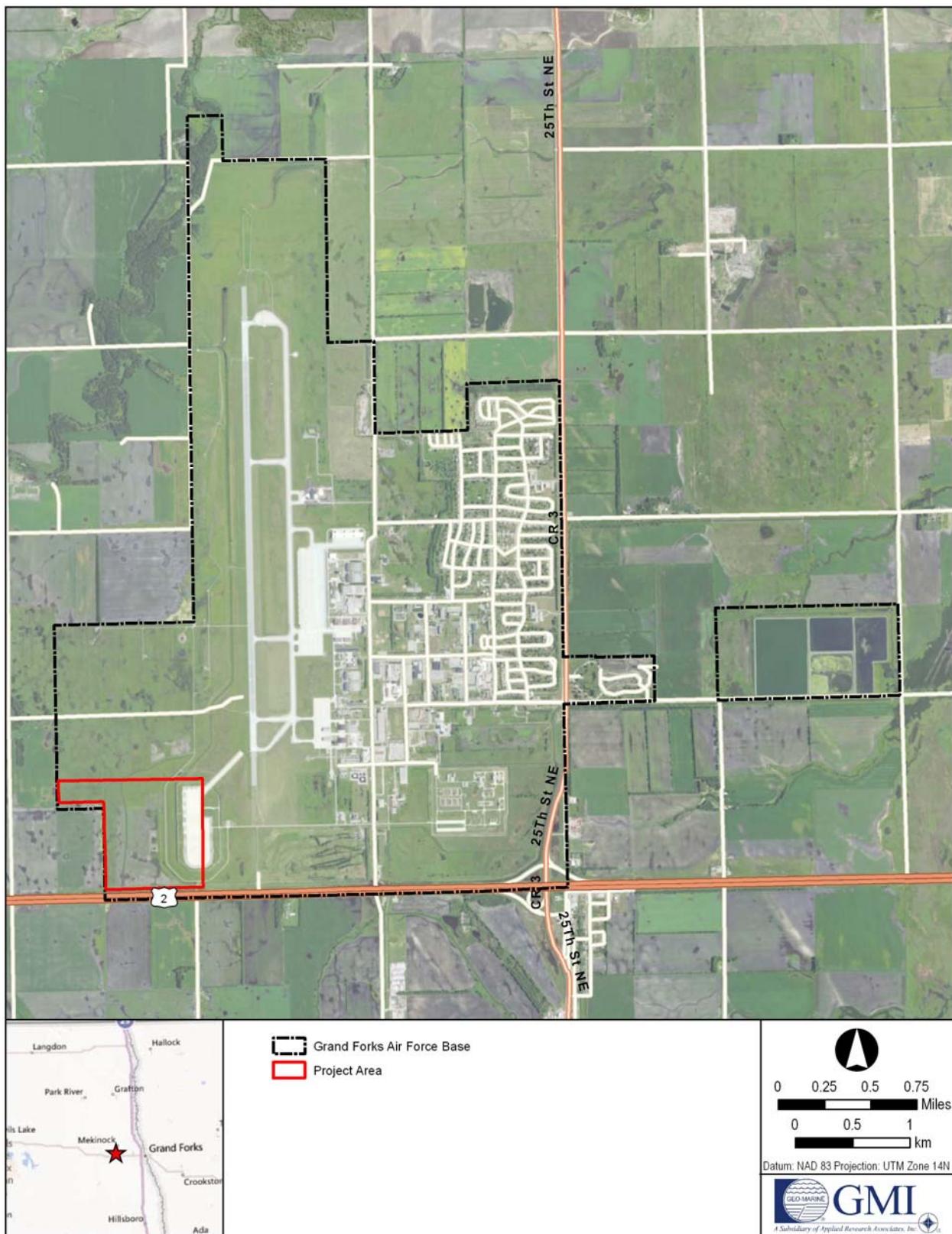


Figure 1. Location of project area on Grand Forks Air Force Base. Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

- Wetlands adjacent to either traditional navigable waters or interstate waters
- Non-navigable tributaries to traditional navigable waters that are relatively permanent, meaning they contain water at least seasonally
- Wetlands that directly abut relatively permanent waters.”

In addition, the following waters are protected by the CWA if a fact-specific analysis determines they have a “significant nexus” to a traditional navigable water or interstate water:

- Tributaries to traditional navigable waters or interstate waters
- Wetlands adjacent to jurisdictional tributaries to traditional navigable waters or interstate waters
- Waters that fall under the “other waters” category of the regulations. The guidance divides these waters into two categories, those that are physically proximate to other jurisdictional waters and those that are not, and discusses how each category should be evaluated.

The following aquatic areas are generally not protected by the CWA:

- Wet areas that are not tributaries or open waters and do not meet the agencies’ regulatory definition of “wetlands”
- Waters excluded from coverage under the CWA by existing regulations

The USACE Wetland Delineation Manual defines wetlands as areas that have positive indicators for hydrophytic vegetation, wetland hydrology, and hydric soils, as well as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987).

The USACE typically takes jurisdiction over wetlands only when they lie within or adjacent to navigable waters or tributaries of such waters where those tributaries bear an ordinary high water mark (OHWM). Wetlands within the 100-year floodplain of another water of the US are considered to be “adjacent” and, therefore, jurisdictional. All other wetlands would be considered isolated and not jurisdictional under the CWA.

The term “OHWM” is defined by the CWA (Section 328.3[e]) for the purposes of lateral jurisdiction, as the:

“...line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in soil character, destruction of terrestrial vegetation, presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding areas.”

2.2 EXECUTIVE ORDER 11990

In accordance with EO 11990 (*Protection of Wetlands*, 24 May 1977), federal agencies performing activities located in or affecting wetlands, and or “providing federally undertaken, financed, or assisted construction”, must ensure that their activities do not result in a net loss of wetlands. Compliance with the EO 11990 necessitates knowledge of the types and locations of wetlands. This wetland delineation was performed to help GFAFB comply with the EO 11990, by providing a current inventory of wetland resources in the proposed project area. Under the definition provided by the EO, wetland areas should be protected if the wetland supports a prevalence of vegetative life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Even when wetlands are not determined as “jurisdictional” under the USACE’s regulation definition, these non-jurisdictional wetlands are still protected under EO 11990. The purpose of EO 11990 is to “minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.” To meet these objectives, the EO requires federal agencies, in planning their actions,

to consider alternatives to federal actions impacting wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided.

2.3 DEPARTMENT OF DEFENSE INSTRUCTION 4715.03 NATURAL RESOURCES CONSERVATION PROGRAM

Department of Defense (DOD) Instruction (DODI) 4715.03 establishes policy for compliance with applicable federal, state, and local statutory and regulatory requirements, EOIs, Presidential memorandums, and other DOD policies for the integrated management of natural resources including lands, air, waters, coastal, and nearshore areas managed or controlled by DOD.

According to the Instruction, the principal purpose of DOD lands, waters, airspace, and coastal resources is to support mission-related activities. Natural resources conservation programs must guarantee DOD continued access to its land, air, and water resources for realistic military training and testing. DOD installations must also demonstrate stewardship of natural resources in their trust by protecting and enhancing those resources for mission support, biodiversity conservation, and maintenance of ecosystem services. The lands, waters, airspace, and coastal resources must be managed for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.

DOD components, such as GFAFB, are directed to use a watershed-based approach to manage operations, activities, and lands so as to avoid or minimize impacts to wetlands, groundwater, and surface waters on or adjacent to installations. With respect to wetlands, DODI 4715.03 states the following:

- (1) DOD components shall ensure no net loss of size, function, and value of wetlands, and will preserve the natural and beneficial values of wetlands in carrying out activities in accordance with EO 11990 and the White House Office on Environmental Policy *Protecting America's Wetlands: A Fair, Flexible, and Effective Approach*, issued 24 August 1993.
- (2) When avoidance of wetlands and other waters of the US is not practicable, and impacts have been minimized, participation in an approved off-site mitigation bank or in-lieu fee instrument is encouraged as sound conservation planning. Off-site mitigation may provide a preferred alternative to meet watershed protection and ecosystem goals and meet future mission requirements. The enhancement, creation, or restoration of wetlands or streams on DOD property may also be an acceptable means for mitigating mission impacts on wetlands.
- (3) In the event that discharges of pollutants into wetlands or other US waters are necessary, DOD installations must obtain appropriate permits and complete mitigation.

3.0 METHODOLOGY

3.1 GEOGRAPHIC INFORMATION SYSTEM DATA ACQUISITION AND LITERATURE REVIEW

In preparation for field surveys, existing literature was reviewed to identify potential wetland or water areas and the extent of their boundaries. Although the literature does not provide sufficient details for a jurisdictional delineation, it provides background information to aid in the on-site survey, including areas of potential waters of the US within the project corridor. The literature evaluated included: 2011 natural color aerial photography, the US Geological Survey (USGS) 7.5-minute quadrangle for Arvilla, North Dakota, US Department of Agricultural (USDA) US Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey for Grand Forks County, North Dakota (2013), National Wetlands Inventory (NWI) maps (2013), and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM; FEMA 2007).

NWI coverage, soils series mapping, and a USGS National Hydrography Dataset (NHD) (2012) with ortho-rectified aerial imagery was assembled to produce comprehensive base maps of the project area. These maps were used to support identification and analysis of the geographic and hydrologic makeup of the project area, as well as to assist with the planning and execution of field surveys.

Previous wetland reports and geographic information system (GIS) data provided by GFAFB were also reviewed prior to the site visit. The reports reviewed included: Wetland Assessment Summary Report 2004; Wetlands Delineation Summary Report 2006; Grand Forks Air Force Base – 2007 Baseline Wetland Characterization Technical Memorandum; Wetland Inventory and Assessment at GFAFB (2012), and the 2012 Integrated Natural Resources Management Plan (INRMP). The same naming structure that was used in previous GFAFB delineations was also utilized in the naming of newly delineated wetland boundaries, allowing for the finalized GIS data to be integrated with existing GFAFB data resources.

3.2 FIELD INVESTIGATION

Field surveys were conducted from 10 to 13 June 2013 and 08 to 14 July 2013. The proposed project area was assessed for waters of the US and wetlands in accordance with the *USACE Wetland Delineation Manual* (Environmental Laboratory 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)* (GP Region Manual; USACE 2010). According to the manual, an area is identified as a wetland only if it meets all three wetlands parameters: hydric soils, hydrophytic vegetation, and wetlands hydrology. Field surveys consisted of identifying the vegetation, soils, and hydrology of potential wetland areas and marking the boundaries of the wetlands using flags that were labeled chronologically for accurate survey retrieval.

Wetland Determination Data Forms for the GP Region Manual (data forms) were completed within plots at representative wetland/non-wetland boundary locations. The data forms correspond to specifically-numbered sampling locations and provide a quantitative description of how the wetland boundary was identified along with representative photographs (**Appendix A**).

Cover of each plant species was recorded in a 15-foot (ft) radius circular plot for saplings/shrubs and a nested 5-ft circular plot for herbs; tree and vine strata were absent since the area was maintained in grassland. Each species was assigned a wetland indicator status using the recently revised National Wetland Plant List (Lichvar 2012). As instructed in the GP Region Manual, if the plant community passed Indicator 1 (Rapid Test for Hydrophytic Vegetation) or Indicator 2 (Dominance Test), then the area was determined to have hydrophytic vegetation. If a plant community passed Indicator 3 (Prevalence Index) and had indicators of hydric soil and wetland hydrology, then the area was determined to have hydrophytic vegetation. The plant community “Problematic Hydrophytic Vegetation” was used to address the effects of managed plant communities, when necessary.

Determination of wetland hydrology at each sample point required documentation of at least one of the 17 possible primary indicators or a minimum of two of the nine secondary indicators.

Soil profiles were sampled to determine if they matched the description of the mapped soil type and to determine if the soil met any of the 28 hydric soil indicators outlined in the GP Region Manual. Our study site was located in the Northern Great Plains which is part of Land Resource Region F; therefore, special care was taken to ensure that the indicators used were applicable to this region.

The boundaries of non-tidal, non-wetland waters (i.e., other waters of the US) were delineated at the OHWM, as defined in 33 Code of Federal Regulations (CFR) 328.3. The OHWM represents the limit of USACE's jurisdiction over non-tidal waters (e.g., streams and ponds) in the absence of adjacent wetlands (33 CFR 328.4). The OHWM can be indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in soil character, destruction of terrestrial vegetation, presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding areas.

The boundaries of wetlands and waters were flagged and sequentially labeled for global positioning system (GPS) use later. The location of each of these flags was recorded with a Trimble GeoXT® GPS system that uses EVEREST™ multipath rejection technology to provide submeter accuracy (Trimble 2010). To minimize error, data were collected as points instead of lines or polygons. Each flag was given a unique identifying number corresponding to each GPS point recorded. At the conclusion of field work, the flags were removed at the request of the GFAFB to avoid causing problems with air operations or mowing.

Real-time data were collected that enabled application of field edits and accurate collection of GPS data using reference stations. Reference stations calculate and broadcast the error for each satellite as each measurement is received by the GPS unit. The reference sources included external beacon and radio sources, as well as a Satellite-Based Augmentation System (SBAS) that uses multiple reference stations in a network to calculate the needed correction. To further minimize error, the GPS data points collected in the field were post-processed and differentially corrected with GPS Pathfinder® Office software. Post-processed data points were entered into a GIS program database, ArcGIS 10™, to create maps and compile geographic calculations. Using these methods, wetland boundary data were collected at less than or equal to 3.28 ft (confidence interval [CI] = 95) horizontal accuracy.

4.0 RESULTS

4.1 DESKTOP ANALYSIS

4.1.1 *Background Data*

GFAFB is located in Grand Forks County, North Dakota. Grand Forks County lies near the North Dakota-Minnesota state line at the junction of Red Lake River and the Red River of the North. The base is located 15 miles (mi) west of the City of Grand Forks and adjacent to the City of Emerado, an incorporated municipality in Grand Forks County. The primary highway access to the base consists of US Highway 2, along the southern boundary of the base, and North Dakota County Road B-3, that borders the base on the east. The proposed mixed-use business park project area is 217 ac of undeveloped land in the southwestern corner of the base (**Figure 1**). The undeveloped land is currently classified as a Conservation Management Area/Conservation Project Restoration Area in the 2011 INRMP (GFAFB 2011).

4.1.2 *General Physiography and Topography*

GFAFB is located within the Central Lowlands physiographic province. The topography of Grand Forks County and the entire Red River of the North Valley is largely a result of the former existence of Glacial Lake Agassiz. The Agassiz Lake Plain District, which it is known as now, extends westward to the Pembina escarpment in the western portion of the county. The extremely flat, lake plain region is characterized by somewhat poorly drained flats and swells separated by poorly drained shallow swales and sloughs.

The project area is generally level with elevations ranging from 900 to 920 ft above mean sea level (**Figure 2**). The project area drains from south to north toward the Turtle River (**Figure 3**). The Turtle River flows west to east-northeast into the Red River of the North, which eventually drains north to Canada.

4.1.3 *Climate*

GFAFB is located in a subhumid continental climate (Doolittle et al 1981). The Northern Plains are characterized by a wide temperature range and frequent, drastic weather changes. The climate is typified by short, humid summers with frequent thunderstorms, and by long, severe winters associated with almost continuous snow cover and ice storms. The spring and fall seasons are generally short transition periods (GFAFB 2011).

The average annual temperature for GFAFB is 40 degrees Fahrenheit (°F) and monthly average temperatures vary from 5°F in January to 70°F in July. The highest and the lowest daily temperatures ever recorded in North Dakota occurred in the same year and were 121°F in July and -60°F in February of 1936. On average there are 12 days per year with maximum temperatures greater than 90°F. The average minimum temperature is -5°F occurring in January. The average number of days with freezing temperatures is 186 per year, of which 58 days are below 0°F (GFAFB 2011).

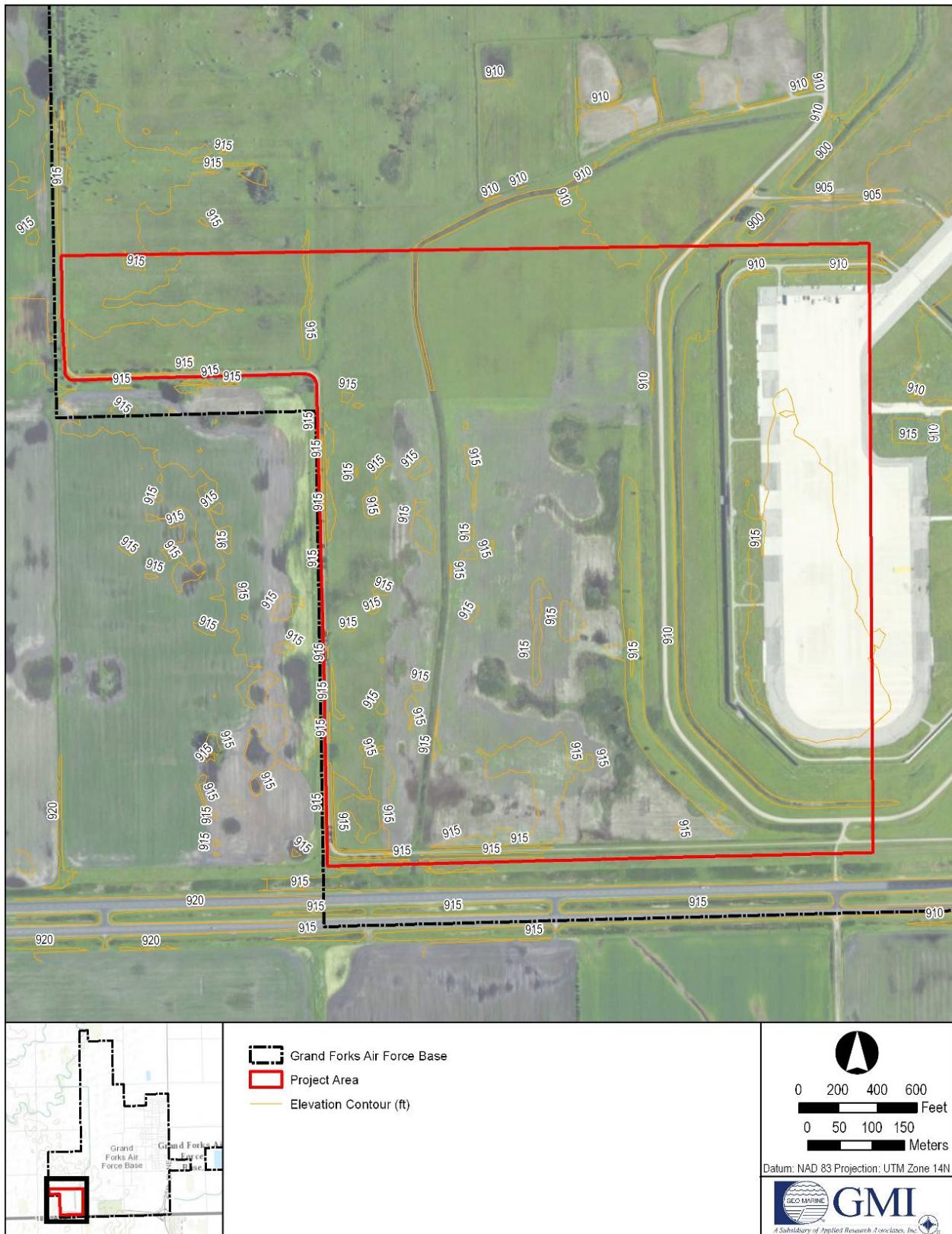


Figure 2. Project area topography. Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and USGS.

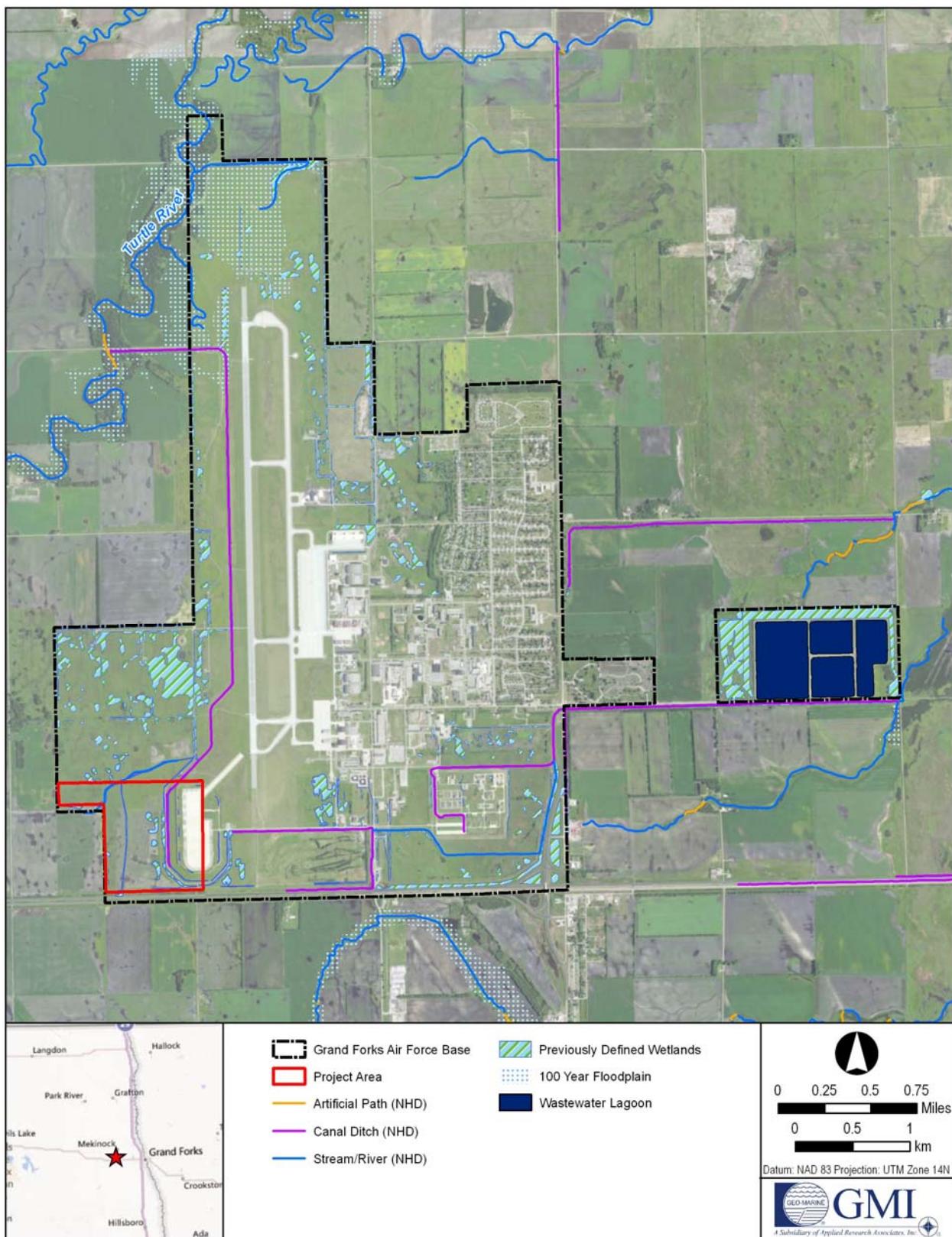


Figure 3. Hydrology data (National Hydrography Dataset and National Wetland Inventory). Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

Average annual precipitation recorded at GFAFB is 19.3 inches. Rainfall is generally well distributed throughout the year, with summer being the wettest season and winter the driest. The maximum rainfall recorded in a 24-hour period was 4.4 inches. An average of 34 thunderstorm days per year is recorded at GFAFB with some of these storms being severe and accompanied by hail and tornadoes. Winters are long with almost continuous snow cover. Average annual snowfall recorded at GFAFB is approximately 3.5 feet. Average monthly snowfall ranges from 1.0 inches in October to 9.6 inches in January, with the maximum monthly snowfall record over the past 60 years of 42 inches in 1966.

4.1.4 Recent Weather

According to data collected at the Grand Forks National Weather Service Station, Grand Forks University, North Dakota (NWS 2013), the climate for Grand Forks was wetter and colder than average in the months of April and May 2013. The average temperature in April 2013 was 32.3°F, 11.1°F colder than normal. In May 2013, the area received 5.18 inches of rain, 2.42 inches above normal. The majority of the rainfall occurred over a 3-day timeframe in which 2.99 inches fell. The month of June 2013 had relatively normal temperatures, with an average temperature of 66.1°F, 0.8°F warmer than normal. Precipitation in June was somewhat lower than normal, with a precipitation of 2.78 inches, nearly an inch less than normal. From 01 to 22 July 2013, the month has been slightly warmer than average, having an average temperature of 72.3°F, 2.7°F warmer than is typical. In addition, during this time July is nearly an inch short of normal precipitation, having received only 1.39 inches thus far.

4.1.5 Vegetation

Historically the project area would have consisted of Tallgrass Prairie. The native Tallgrass Prairie ecosystem was dominated by some 40 to 60 species of tall grasses such as big bluestem (*Andropogon gerardii*), indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and little bluestem (*Schizachyrium scoparium*) which comprised up to 80 percent of the foliage; the remaining 20 percent was comprised of a large variety of forbs (Graham 2011). This highly productive vegetation could grow to 8 or 9 ft above ground by each fall with similarly impressive belowground production. In its natural state, prior to the 19th century, the Tallgrass Prairie was maintained by a combination of stresses including fire, grazing, and climate (Graham 2012).

Today, most of the project area is maintained in grassland. In 2011, a one-time project recommended in the INRMP was conducted to till and seed the area with native grass species to provide better habitat and to help control noxious weeds. Portions of the area, the road and wall perimeters and the two large drainage ditches (linear wetlands) are mowed once a year. There is a hay lease in the north-central area of the project area that is subject to mowing between 15 July and 01 September.

4.1.6 Soils

Four primary soil series are mapped at the project area including: Antler-Mustinka silt loam; Antler, saline-Mustinka silt loam; Gilby loam; and Grimstad fine sandy loam (**Figure 4**). Each of these soil series is typified by deep, dark upper horizons that developed as a result of the highly productive grasslands they support.

Antler-Mustinka silt loams, 0 to 2% slopes are classified as Prime Farmland Soils. A general description of the soil types located in the project area is described in **Table 1**. Depressions are noted to be frequently ponded for long durations. A site-specific soil report was generated from the USDA NRCS Web Soil Survey (**Appendix B**).

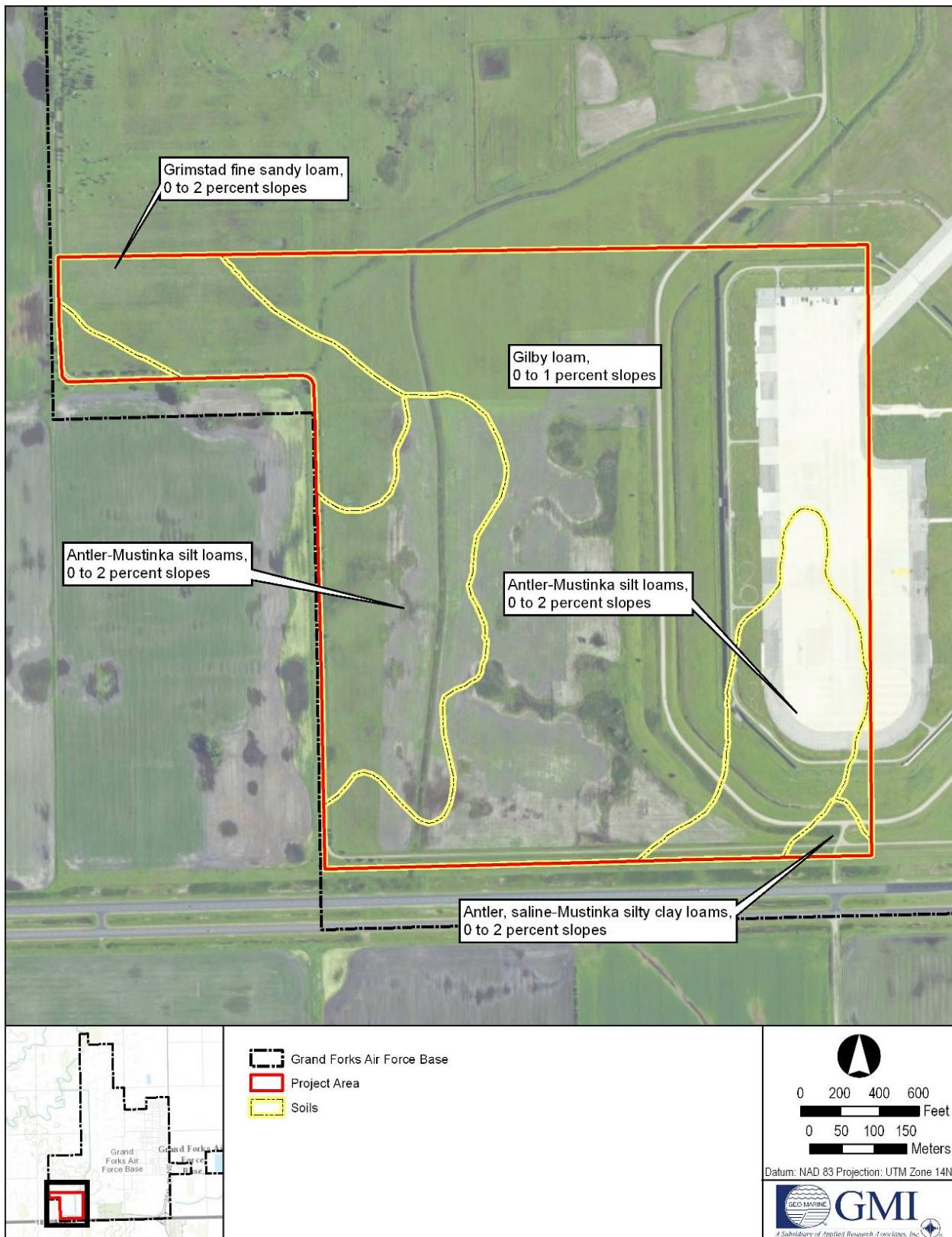


Figure 4. Project area soils. Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and USDA NRCS Web Soil Survey.

Table 1. Soil types associated with the project area

Soil Unit Name	Hydric Rating	Soil Unit Description
	(Hydric or Not Hydric)	
Antler-Mustinka silt loams, 0 to 2% slopes	Partially hydric (33% – 65%)	The deep, level soil is located on broad flats with depressions, in areas between old glacial beaches. Depressions are frequently ponded for long periods during spring runoff and heavy rainfall. The soils are stony in most areas. Permeability is moderately slow to slow and the water capacity is high.
Antler, saline-Mustinka silty clay loams, 0 to 2% slopes	Predominantly non-hydric (1% – 32%)	The deep, level soil is located on broad flats in areas between old glacial beaches. The flats are pitted with depressions. The natural drainage pattern is poorly defined. Excess surface water frequently ponds in the undrained depressions for long periods during spring runoff and heavy rainfall. Permeability is moderately slow to slow and the water capacity is moderate to high.
Gilby loam, 0 to 1% slopes	Predominantly non-hydric (1% – 32%)	This deep, level, somewhat poorly drained soil is on broad flats in areas between old glacial beaches. It is stony in some areas. Gilby soils contain more clay than Grimstad soils. The soil has moderately slow permeability. Available water capacity is high and runoff is very slow.
Grimstad fine sandy loam, 0 to 2% slopes	Predominantly non-hydric (1% – 32%)	This deep, level, somewhat poorly drained soil is on broad flats, in shallow swales, and in seepy areas between old glacial beaches. It is stony in some areas. It is rapidly permeable in the upper part of the substratum and moderately permeable in the lower part. Available water capacity is moderate and runoff is slow.

Source: Doolittle et al. 1991; USDA NRCS Web Soil Survey 2013

4.1.7 Watershed

The project area is located within USGS Hydrologic Unit Code 09020307 – Turtle River Watershed which flows to the Red River of the North. The 25.27-mi section of the Turtle River (Waterbody ID: ND-09020307-019-S_00) to which the project area flows is listed as impaired by the USEPA for arsenic, cadmium, fecal coliform, and selenium (USEPA 2012).

4.1.8 Federal Emergency Management Agency and Flood Insurance Rate Map

A review of FEMA and FIRMs indicated that the project area is not within the 100-year floodplain (see **Figure 3**).

4.1.9 United States Geological Survey and National Hydrography Dataset Maps

The USGS 7.5-minute topographic map for Arvilla, North Dakota (2011) was used to investigate general drainage patterns and evidence of modifications that could potentially alter water flow. The map illustrates major drainage features, ponds, and streams in the area; however, with an effective mapping contour interval of 5 ft the map does not adequately identify all local drainage patterns within the project area; therefore, the presence of drainage features, evidence of flow, and flow direction were noted while on site. Drainage features are common on GFAFB. According to the NHD, two drainages are depicted connecting Turtle River, a TNW, to waters located within the project area.

4.1.10 Aerial Photography

Aerial imagery was used to assist in identifying water features and saturated areas based on the photograph's color signatures.

4.1.11 Previous Wetland Data Sources

Previous wetland assessments conducted at GFAFB include a wetland identification and delineation from 1999, a site-wide wetland assessment and summary in 2004, a site-specific wetland delineation of the new proposed fire station area in 2005, a selected wetland delineation in 2006, a wetlands characterization project in 2007, a wetland inventory and assessment in 2011, and two project/site-specific wetland delineations conducted in 2012. All of these efforts have been compiled into comprehensive GIS files. These files were provided by the base for review prior to any field work conducted for the EUL site (see **Figure 3**). Prior to the field surveys, the GIS data identified 26 wetlands in our project area, totaling 13.68 ac.

4.2 FIELD SURVEY RESULTS

Field surveys were conducted from 10 to 13 June and from 08 to 14 July 2013. The resulting effort identified 32 wetland polygons totaling 23.795 acres of wetlands within the project boundary (**Table 2**). **Table 3** details how the current wetland acreage and PEM status has changed from previous wetland reports. The delineated wetlands and their associated identifiers are depicted in **Figure 5**. **Figures 6** through **10** display the shapes of the delineated wetlands and the associated delineation boundary points that were taken in the field. Of the 23.795 ac of wetlands delineated, 21 wetland polygons totaling 9.726 ac have no observed physical connection to downstream traditional navigable waters and appear to be 'isolated'.

Thirty-five data forms were filled out across the site representing various wetland types, soil conditions, and landscape settings as necessary to explain the wetland to upland boundaries that were flagged in the field (**Table 4**). **Figure 11** depicts the location of the points where upland to wetland data forms were completed.

Table 2. Wetlands mapped in the project area

Wetland ID	Acres	Wetland Type	Jurisdictional Status	Comment
FLS-01	1.149	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-02	4.048	PEM	Isolated	Large, potentially high functioning PEM wetland; possible remnant prairie pothole
FLS-06	0.73	PEM	Isolated	Medium-size, depressional emergent marsh
FLS-07	8.011	PEM	Connected/Jurisdictional	Large, potentially high functioning PEM wetland; possible remnant prairie pothole
FLS-08A	0.144	PEM	Isolated	Linear wetland resulting from earthen berm
FLS-08B	0.03	PEM	Isolated	Linear wetland resulting from earthen berm
FLS-08C	0.143	PEM	Isolated	Linear wetland resulting from earthen berm

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Wetland ID	Acres	Wetland Type	Jurisdictional Status	Comment
FLS-08D	0.012	PEM	Isolated	Linear wetland resulting from earthen berm
FLS-09	1.686	PEM	Isolated	Linear wetland resulting from earthen berm
FLS-10	3.65	PEM	Connected/Jurisdictional	Large, potentially high functioning PEM wetland; possible remnant prairie pothole
FLS-13	0.614	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-17	0.042	PEM	Isolated	Linear wetland located in excavated drainage
FLS-31A	0.115	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-31B	0.108	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-31D	0.213	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-31F	0.161	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-31G	0.014	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-31H	0.023	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-31I	0.011	PEM	Connected/Jurisdictional	Linear wetland located in excavated drainage
FLS-53	0.504	PEM	Isolated	Medium-size, depressional emergent marsh
FLS-54	0.332	PEM	Isolated	Medium-size, depressional emergent marsh
FLS-55	0.079	PEM	Isolated	Very small, depressional emergent marsh
FLS-56	0.181	PEM	Isolated	Small, depressional emergent marsh
FLS-57	0.153	PEM	Isolated	Small, depressional emergent marsh
FLS-58	0.354	PEM	Isolated	Medium-size, depressional emergent marsh
FLS-59	0.13	PEM	Isolated	Small, depressional emergent marsh
FLS-60	0.033	PEM	Isolated	Very small, depressional emergent marsh
FLS-61	0.743	PEM	Isolated	Low prairie; observed some drainage to FLS-07
FLS-62	0.163	PEM	Isolated	Small, depressional emergent marsh

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Proposed Business Park, Grand Forks Air Force Base

Wetland ID	Acres	Wetland Type	Jurisdictional Status	Comment	
FLS-63	0.041	PEM	Isolated	Very small, depressional emergent marsh	
FLS-64	0.158	PEM	Isolated	Small, depressional emergent marsh	
FLW-65	0.022	PEM	Isolated	Linear wetland located in excavated drainage	
Total	23.795				

TNW = traditional navigable water; PEM = palustrine emergent

Table 3. Wetlands acreage and classification comparison

OLD Wetland ID	OLD Wetland acreage	OLD NWI Classification	New Wetland ID	New Wetland Acreage	New NWI Classification	Change
FLS-17	0.075568	PEM	FLS-17	0.041782	PEM	Wetland runs off project site most likely reduced in size
FLS-04b	0.122455	PSS	FLS-10	(acreage below)	(below)	Expanded and was included in FLS -10
FLW-65	2.705951	PSS	FLS-10 / FLW65	(acreage below)	(below)	Reduced and split up
FLS-04a	0.182276	PEM	FLS-10	(acreage below)	(below)	Expanded and was included in FLS -10
FLS-11	0.162515	PSS	FLS-10	(acreage below)	(below)	Expanded and was included in FLS -10
FLS-10	0.264267	PEM	FLS-10	3.650189	PEM	Expanded
FLS-05	0.007216	PEM	NA			Was not in project area
FLW-62	0.128075	PEM	NA			Was not in project area
FLS-06	0.576126	PSS	FLS-06	0.730296	PEM	Expanded
FLS-03	0.770664	PEM	FLS-02	(acreage below)	(below)	Expanded and was included in FLS -02
FLS-02	1.245496	PEM	FLS-02	4.048473	PEM	Expanded
FLS-15	0.174488	PEM	FLS-13	(acreage below)	(below)	Decreased and was included in FLS -13
FLS-13	0.092958	PEM	FLS-13	0.613868	PEM	Expanded
FLS-12	0.160291	PEM	NA			No longer a wetland
FLS-01a	0.754319	PSS	FLS-01	1.148737	PEM	Expanded
FLS-01b	1.470393	PEM	FLS-01	(acreage above)	(above)	Expanded and was included in FLS -01
FLS-09	1.365334	PEM	FLS-09	(acreage below)	(below)	Wetland expanded and took in part of FLS-08
FLS-08	2.120591	PEM	FLS-09	1.685792	PEM	Wetland decreased in size and was split up into four parts
			FLS-08D	0.012443	PEM	
			FLS-08C	0.143161	PEM	
			FLS-08B	0.03003	PEM	
			FLS-08A	0.143883	PEM	

Table 3 (continued). Wetlands acreage and classification comparison

OLD Wetland ID	OLD Wetland acreage	OLD NWI Classification	New Wetland ID	New Wetland Acreage	New NWI Classification	Change
FLS-07	1.32927	PEM	FLS-07	8.011018	PEM	Expanded
FLS-14	0.223192	PEM	FLS-07	(acreage above)	(above)	Expanded and was included in FLS -7
FLS-31a	0.038535	PEM	FLS-31a	0.115422	PEM	Expanded
FLS-31b	0.00985	PEM	FLS-31b	0.107597	PEM	Expanded
FLS-31d	0.056911	PEM	FLS-31d	0.212633	PEM	Expanded
FLS-31e	0.048863	PEM	FLS-31d	(acreage above)	(above)	Expanded and was included in FLS -31d
FLS-31f	0.069012	PEM	FLS-31f	0.160776	PEM	Expanded
FLS-31g	0.02414	PEM	FLS-31g	0.013968	PEM	Decreased in size
			FLS-31H	0.023058	PEM	New wetland
			FLS-31I	0.010885	PEM	New wetland
			FLS-64	0.157707	PEM	New wetland
			FLS-53	0.503733	PEM	New wetland
			FLS-54	0.331564	PEM	New wetland
			FLS-55	0.078814	PEM	New wetland
			FLS-56	0.180559	PEM	New wetland
			FLS-57	0.153082	PEM	New wetland
			FLS-58	0.353703	PEM	New wetland
			FLS-59	0.129764	PEM	New wetland
			FLS-60	0.032648	PEM	New wetland
			FLS-61	0.743093	PEM	New wetland
			FLS-62	0.163389	PEM	New wetland
			FLS-63	0.040608	PEM	New wetland
			FLW-65	0.021894	PEM	New wetland

NWI = National Wetland Inventory

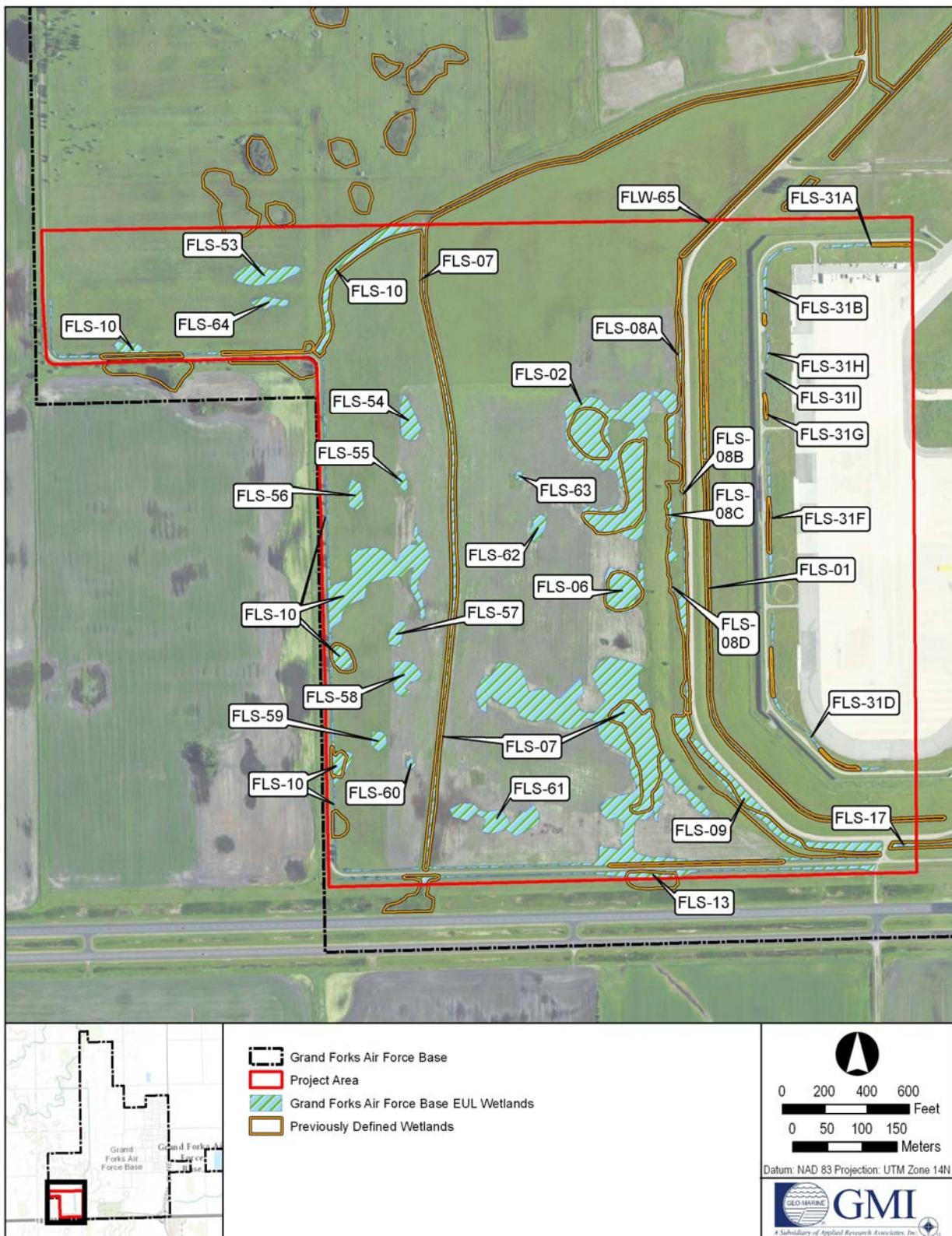


Figure 5. Delineated wetlands in project area. Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

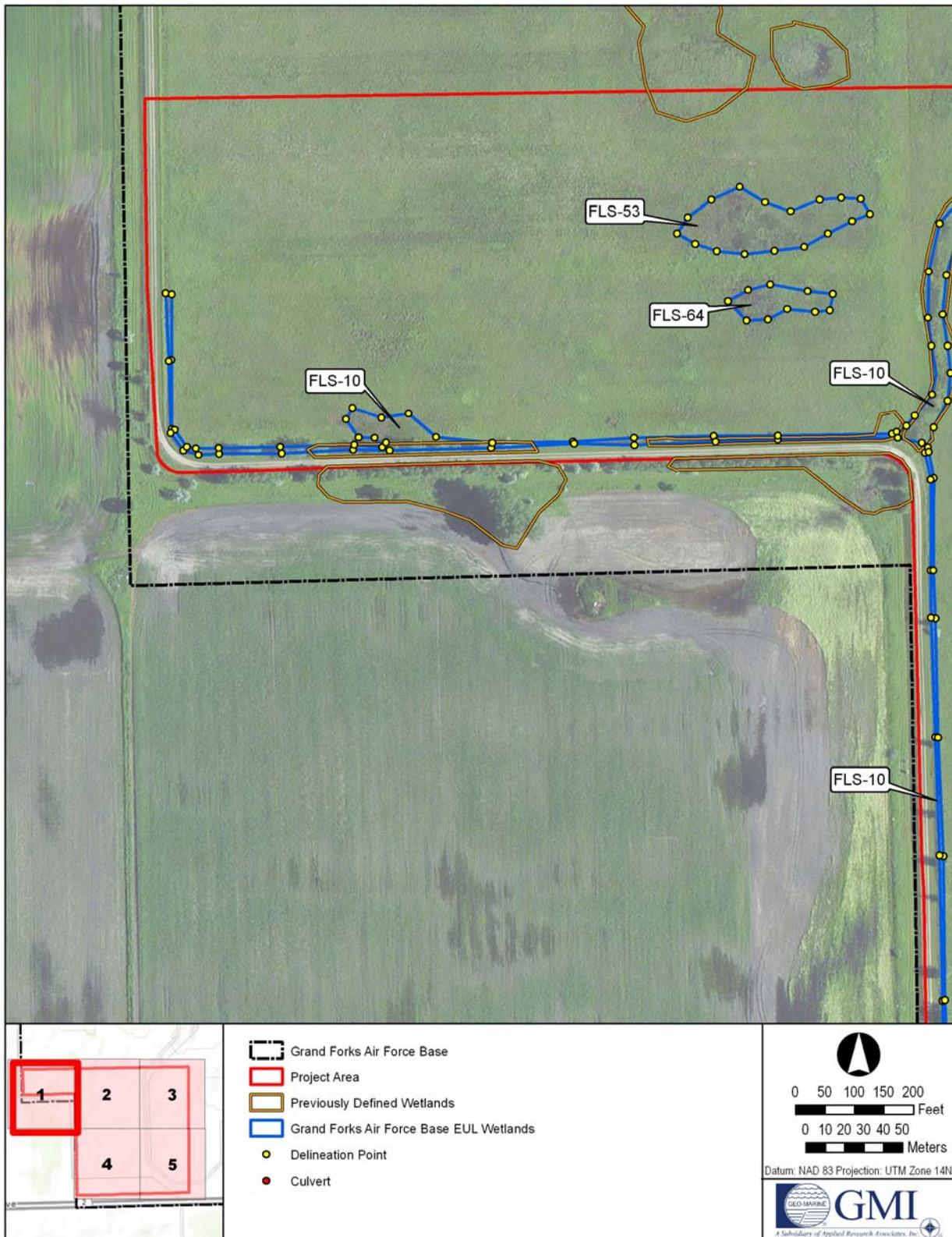


Figure 6. Project area wetland results (layout 1 of 5). Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

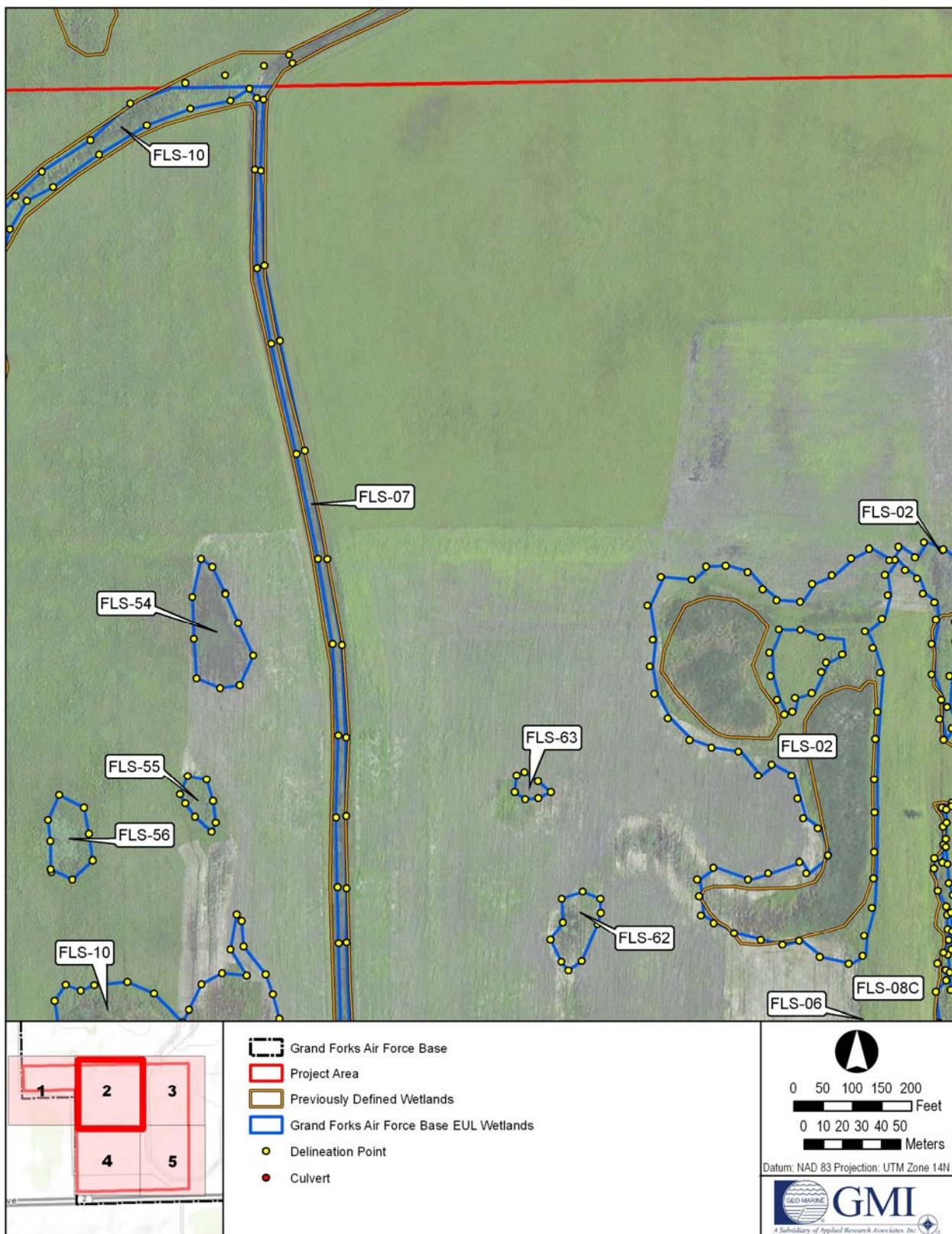


Figure 7. Project area wetland results (layout 2 of 5). Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

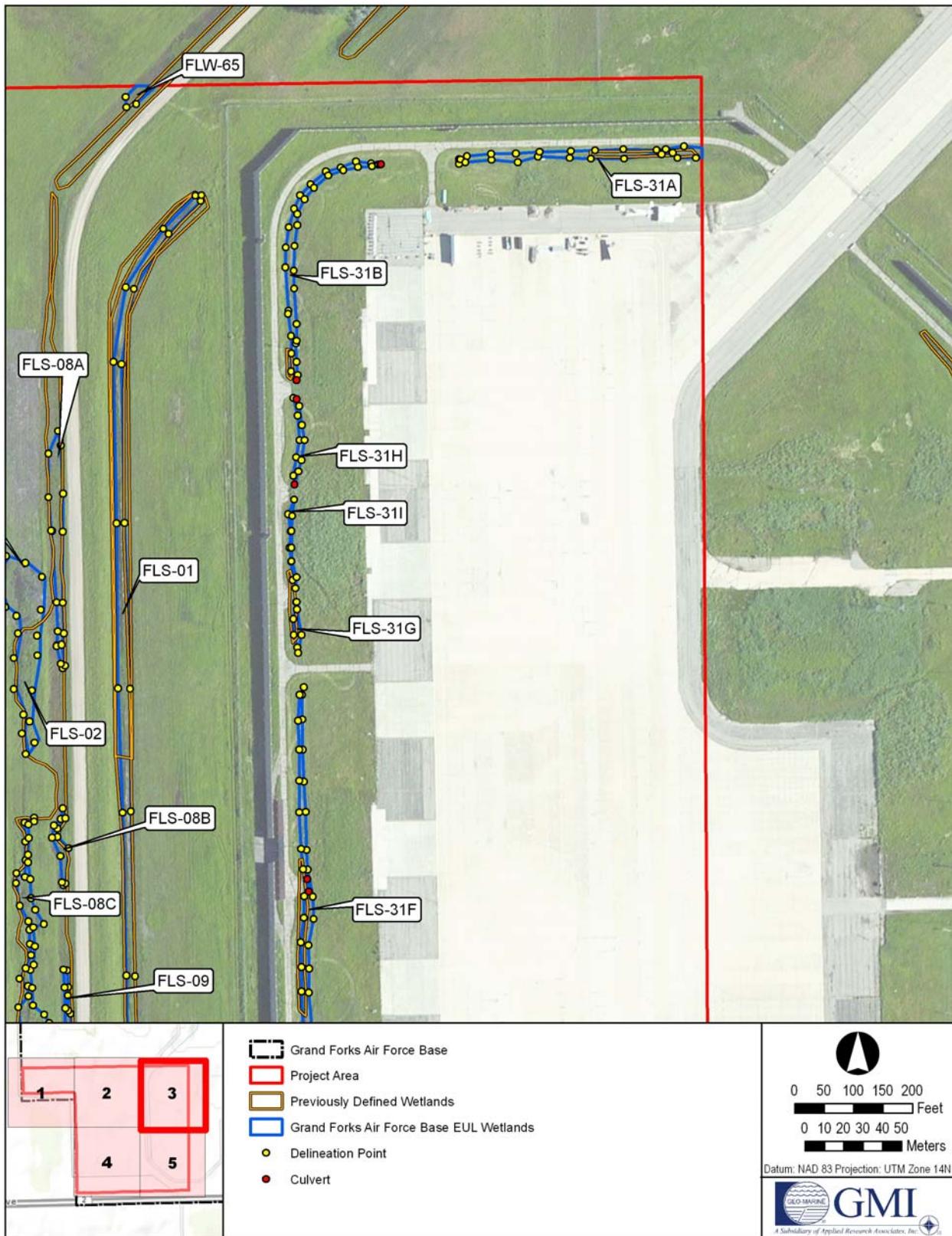


Figure 8. Project area wetland results (layout 3 of 5). Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

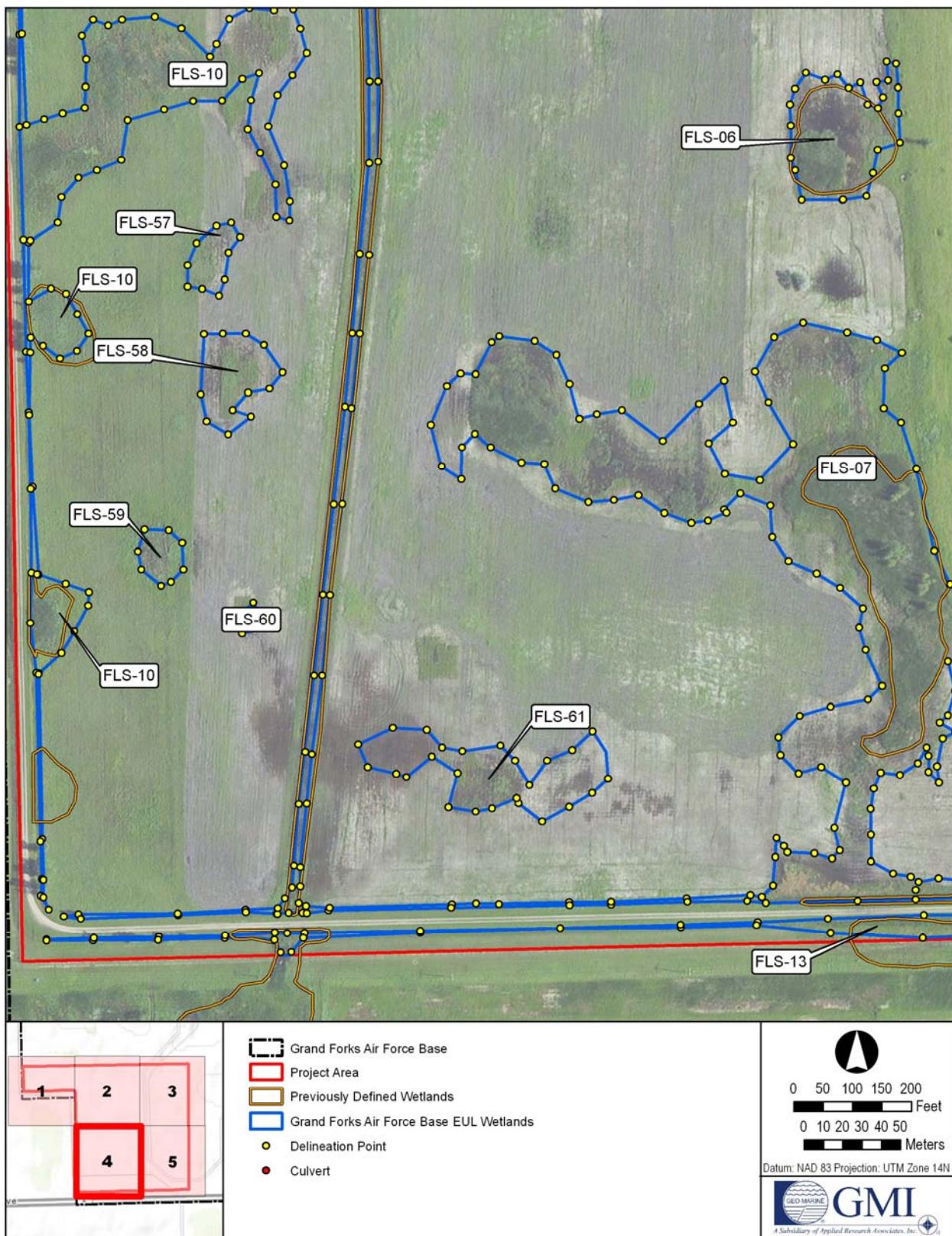


Figure 9. Project area wetland results (layout 4 of 5). Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

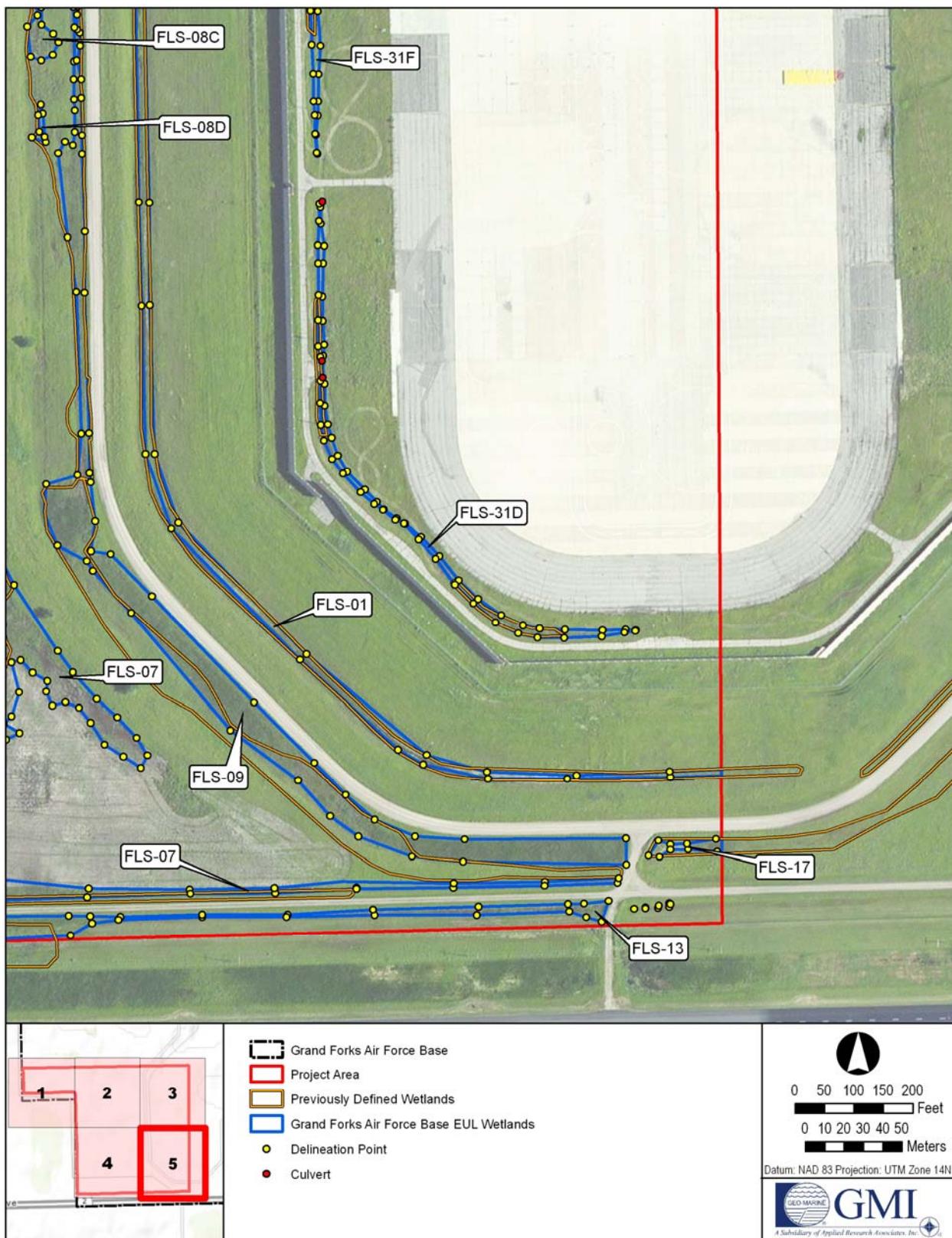


Figure 10. Project area wetland results (layout 5 of 5). Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

Table 4. Summary of wetland data sheets

Data Point	Latitude	Longitude	Indicators Met			Wetland	Community Type	Dominant Vegetation
			Vegetation	Soil	Hydrology			
DP-1-W	47.93516	-97.41242	1, 2	A4, A12	B4, C1, C9, D5, D7	FLS-07	PEM	<i>Typha angustifolia</i>
DP-2-U	47.93511	-97.41270	*	*	*	Upland	Upland Prairie	<i>Elymus repens, Solidago canadensis</i>
DP-3-W	47.93602	-97.41486	1, 2	A4	B4, B9, C1, C9, D5	FLS-07	PEM	<i>T. latifolia</i>
DP-4-U	47.93594	-97.41489	*	*	*	Upland	Upland Prairie	<i>S. canadensis, Bromus inermus, S. gigantea</i>
DP-5-U	47.93516	-97.41554	*	*	B4, C9	Upland	Upland Prairie	<i>E. repens</i>
DP-7-W	47.93467	-97.41520	3	A12	B4, B6, C9	FLS-61	PEM	<i>E. repens; T. latifolia</i>
DP-8-U	47.93450	-97.41517	1, 2	*	D5	Upland	Upland Prairie	<i>Agrostis gigantea</i>
DP-9-W	47.93530	-97.41804	1, 2	A12	B4, B9, C9, D5	FLS-10	PEM	<i>T. angustifolia</i>
DP-10-U	47.93524	-97.41787	*	A12	*	Upland	Upland Prairie	<i>B. inermus</i>
DP-11-W	47.93555	-97.41745	P	A12	C9, D7	FLS-59	PEM	<i>E. repens; T. angustifolia</i>
DP-12-W	47.93528	-97.41682	3	F6	B9, C9	FLS-60	PEM	<i>E. repens; Carex utriculata</i>
DP-13-U	47.93506	-97.41662	3	*	*	Upland	Upland Prairie	<i>Rosa arkansan; A. gigantea</i>
DP-14-W	47.93649	-97.41704	1, 2	A12	B4, B9, C9, D5	FLS-58	PEM	<i>T. angustifolia; Hordeum jubatum</i>
DP-15-U	47.93671	-97.41697	*	F7	*	Upland	Upland Prairie	<i>R. arkansan; B. inermus</i>
DP-16-W	47.93770	-97.41735	1, 2	F7	B4, B9, C9, D5, D7	FLS-10	PEM	<i>Phalaris arundinacea; T. angustifolia</i>
DP-17-U	47.93760	-97.41729	*	*	*	Upland	Upland Prairie	<i>Symporicarpos occidentalis; Apocynum cannabinum</i>
DP-18-W	47.93880	-97.41770	P	A12, F6	B4, B9, C9	FLS-56	PEM	<i>E. repens; T. angustifolia</i>
DP-19-U	47.93883	-97.41750	*	A11	*	Upland	Upland Prairie	<i>R. arkansan; B. inermus</i>
DP-20-W	47.94160	-97.41946	2	A4, A12	B4, B9, C1, C9, D5	FLS-53	PEM	<i>Cirsium flodmanii; C. utriculata</i>
DP-21-U	47.94150	-97.41948	*	*	*	Upland	Upland Prairie	<i>S. occidentalis; B. inermus</i>
DP-22-W	47.93559	-97.41144	1, 2	A4	B4, B9, C1, C9, D5	FLS-09	PEM	<i>T. angustifolia</i>
DP-23-W	47.93752	-97.41165	1, 2	F6	B4, B9, D5	FLS-08D	PEM	<i>H. jubatum; T. angustifolia</i>

Table 4 (continued). Summary of wetland data sheets

Data Point	Latitude	Longitude	Indicators Met			Wetland	Community Type	Dominant Vegetation
DP-24-W	47.93808	-97.41168	P	F6	B4, B9, C9	FLS-08C	PEM	<i>E. repens; A. cannabinum</i>
DP-25-W	47.93758	-97.41237	3	A12	B4, B9, C9, D7	FLS-06	PEM	<i>Alopecurus arundinaceus; E. repens</i>
DP-26-U	47.93789	-97.41237	*	*	*	Upland	Upland Prairie	<i>Nasella viridula</i>
DP-27-U	47.93709	-97.41462	*	*	C9, D7	Upland	Upland Prairie	<i>E. repens</i>
DP-28-W	47.93834	-97.41425	P	A12	B4, B9, C9, D7	FLS-62	PEM	<i>E. repens; A. gigantea</i>
DP-29-W	47.93896	-97.41457	P	F7	C9, D7	FLS-63	PEM	<i>E. repens; Rumex crispus</i>
DP-30-U	47.93931	-97.41397	*	A12	*	Upland	Upland Prairie	<i>E. canadensis; B. inermis; N. viridula</i>
DP-31-W	47.93944	-97.41361	1, 2	A4	B4, B9, C1, C9, D5	FLS-02	PEM	<i>P. arundinacea; T. latifolia</i>
DP-32-U	47.94118	-97.41344	*	*	*	Upland	Upland Prairie	<i>R. arkansan; B. inermis</i>
DP-33-W	47.94033	-97.41146	1, 2	F7	B4, B9, C9, D5	FLS-08A	PEM	<i>Eleocharis palustris; Schoenoplectus tabernaemontani</i>
DP-34	47.94042	-97.41100	1, 2	A4, F1	A1, A2, A3, B9, C1, C3, D5	FLS-01	PEM	<i>T. angustifolia; E. palustris</i>
DP-35	47.93817	-97.40978	1, 2	A11	B4, B9, B10, D5	FLS-31F	PEM	<i>T. angustifolia</i>

Vegetation: 1 = rapid test; 2 = dominance test >50%, 3 = prevalence index ≤3.0; P = problematic hydrophytic vegetation; Soils: A4 = hydrogen sulfide; A11 = depleted below dark surface; A12 = thick dark surface; F6 = redox dark surface; F7 = depleted dark surface; Hydrology: A1 = surface water; A2 = high water table; A3 = saturation; B4 = algal mat or crust; B6 = soil surface cracks; B9 = water-stained leaves; B10 = drainage patterns; C1 = hydrogen sulfide odor; C3 = oxidized rhizospheres on living roots; C9 = saturation visible on aerial imagery; D5 = facultative (FAC)-neutral test; D7 = frost-heave hummocks;
* = no indicator met

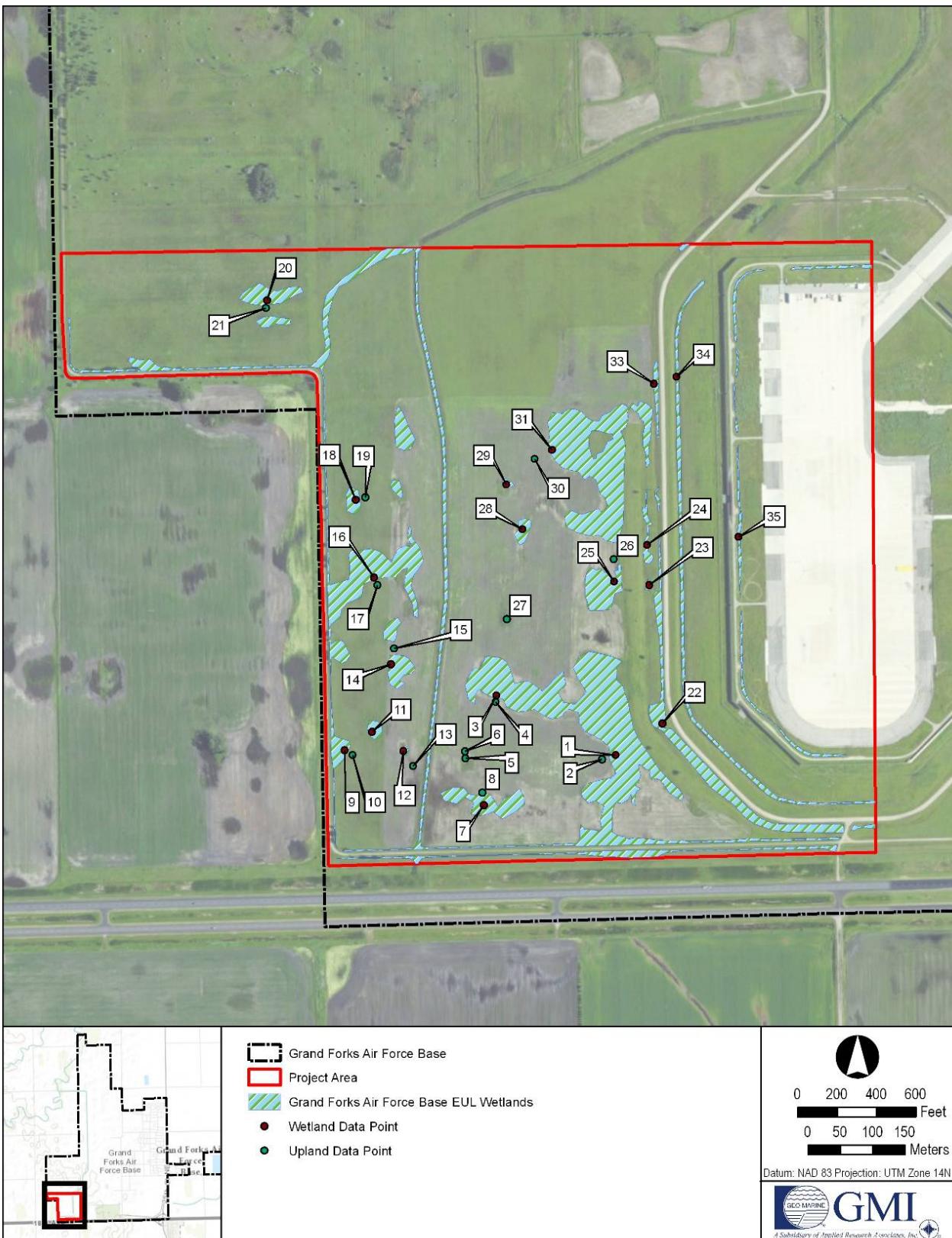


Figure 11. Location of points where upland and wetland data forms were completed. Source: Geo-Marine, Inc., ESRI/Microsoft (Bing) 2011 aerial imagery, and GFAFB GIS.

4.2.1 *Jurisdictional Wetlands*

Wetland FLS-07 is the single largest wetland mapped in the project area at 8.011 ac. This palustrine emergent (PEM) wetland area is underlain by Gilby loam and is comprised of several deeper pothole-like wetlands connected within a larger depressional area that drains south and develops into a system of linear wetlands along the roads. The linear wetland system collects drainage along the southern perimeter road flowing west and then north into a channel that roughly bisects the project area (**Figure 12**). This linear wetland drainage serves as a primary connection to the Turtle River, a TNW. The GFAFB Integrated Natural Resources Management Plan (INRMP) indicates that portions of the drainage system located north of the project area were previously delineated and provided Jurisdictional Determinations dated 23 May 2005 and 10 January 2007 (GFAFB 2011). Wetlands FLS-14 and FLW-65 from previous wetland reports (CH2M Hill 2004, 2007) are included in Wetland FLS-07.



Figure 12. Looking north along linear Wetland FLS-07.

The deepest portions of Wetland FLS-07 contained 0.25 to 0.5 ft of water during this field survey, thus providing potential habitat for waterfowl. The following species were observed utilizing wetlands on and near the site: Northern pintail (*Anas acuta*), gadwall (*A. strepera*), teal (*A. spp.*), and mallards (*A. platyrhynchos*).

Wetland FLS-10 is situated on the western boundary of the project area and extends east roughly 500 ft. It is a 3.650-ac PEM wetland that is contiguous with a linear wetland system that drains north and eventually converges with FLS-07. A few shrubs and saplings are present near the perimeter road (**Figure 13**).



Figure 13. Looking north along Wetland FLS-10.

Wetland FLS-01 is a linear wetland located within an excavated drainage and dominated by narrowleaf cattail (*Typha angustifolia*), creeping meadow foxtail (*Alopecurus arundinaceus*) foxtail barley (*Hordeum jubatum*), and reed canary grass (**Figure 14**). It is 1.149 ac that, under high rainfall conditions, flows north eventually exiting the project area through two concrete culverts. The drainage continues north to the Turtle River, a TNW. The GFAFB INRMP indicates that portions of the drainage system located north of the project area were previously delineated and determined to be jurisdictional by the USACE on 23 May 2005 and 10 January 2007 (GFAFB 2011).



Figure 14. Looking north along Wetland FLS-01.

Wetland FLS-13 is a 0.614-ac linear wetland within an excavated drainage located south of the perimeter road. Like most of the linear wetlands in the area, it is dominated by narrowleaf cattail, reed canary grass, and foxtail barley. A culvert connects FLS-13 to FLS-07 which follows the flow path north to the Turtle River as previously stated.

Wetlands FLS-31D, FLS-31F, FLS-31A, FLS-31B, FLS-31H, FLS-31G, and FLS-31I are linear wetlands that are separated from FLS-01 by underground culverts. The dominant vegetation cover varies from narrowleaf cattail and reed canary grass in the wetter sections to foxtail barley, Indian hemp (*Apocynum cannabinum*) and quackgrass (*Elymus repens*) in the more mesic sections. The drainage on the east side of the Alpha Ramp security wall is connected to FLS-01 via an underground culvert system flowing from east to west then north. As with most of the linear wetlands in this project area, wetland function is low relative to larger, natural systems in the region, although the wetlands do attenuate high runoff flows and perhaps help trap pollutants. These linear systems were either straightened and deepened from natural drainages or may have been created for drainage purposes in the past; nevertheless, these linear wetlands are currently contiguous with other jurisdictional wetlands.

4.2.2 Isolated Wetlands

Wetland FLS-02 is a 4.048-ac emergent marsh area that may be a relic prairie pothole. It is perhaps the deepest depressional wetland mapped within the entire project area. The center of this wetland contained up to 1.0 ft of water during the field survey, thus providing potential habitat for waterfowl. As noted for Wetland FLS-07, the following species were observed utilizing wetlands on and near the site: Northern pintail, gadwall, teal, and mallards.

Though there may be an overland flow connection between FLS-02 and Wetland FLS-08A during high rainfall events, no evidence of a physical connection to downstream RPW or TNWs was observed.

Wetlands FLS-09, FLS-08A, FLS-08B, FLS-08C, FLS-08D, and FLS-17 are linear wetlands that appear to have been caused by the construction of an earthen berm and the perimeter road. Surface water collects in these relatively flat or slightly depressional areas. If these areas were intended to support site drainage, they have not been maintained for that purpose and thus, do not connect to any downstream RPWs or TNWs. Together they comprise 2.057 ac of PEM wetlands. They have been disturbed by dirt road maintenance and wetland function is low relative to natural systems in the region.

Wetland FLS-61 is a 0.743-ac low prairie wetland. A flow connection was observed between this wetland and FLS-07 due to a 4-in rain event preceding the June 2013 field effort. During the July 2013 field effort no indication of a connection was noted and the wetland boundary did not extend between the two wetlands, which are separated by approximately 80 ft.

Wetland FLS-06 is a medium-sized depressional wetland (0.730 ac) that lies between FLS-02 and FLS-07. Creeping meadow foxtail was co-dominant with quackgrass, though narrowleaf cattail and reed canary grass were noted in wetter sections of the wetland. This area is not physically connected to neighboring wetlands.

Wetlands FLS-53, FLS-54, and FLS-58 are similarly sized and situated emergent, depressional wetlands that lack physical connections to neighboring wetland systems. They are roughly circular to oval in shape. The adjacent uplands were 0.25 – 1.0 ft higher in elevation than the depressional wetlands and typically lacked vegetation and hydrologic indicators as a result.

Wetlands FLS-55, FLS-56, FLS-57, FLS-59, FLS-60, FLS-62, and FLS-64 are all small to very small depressional emergent wetlands that lack physical connections to neighboring wetland systems. They range in size from 0.181 – 0.033 ac and are generally oval to circular in shape.

Wetlands FLS-17 and FLW-65 are located within excavated drainages that terminated at the project area boundary. Both are situated at drainage divides and neither was observed to have a contiguous physical connection to downstream RPW or TNWs.

4.2.3 Other Observations

The following species were observed utilizing wetlands on and near the project area:

- Mammals: moose (*Alces alces*)
- Birds: bobolink (*Dolichonyx oryzivorus*), gadwall, mallard, Northern pintail, teal, sharp-tailed grouse (*Tympanuchus phasianellus*), and upland sandpiper (*Bartramia longicauda*)
- Reptiles & Amphibians: common garter snake (*Thamnophis sirtalis*) and Northern leopard frog (*Rana pipiens*)
- Plants: Thirty-six plant species were identified while completing the wetland/upland data forms (**Table 5**). Many other species were noted on the site, but were not recorded in plot data. Of particular note was an observation of white lady's slipper orchid (*Cypripedium candidum*, G4/S2S3) during the June 2013 field effort. This species occurred along one of the linear wetlands that were mowed between the June and July field surveys.

Table 5. Plant species identified in plots

Scientific Name	Common Name	Indicator Status	Stratum
<i>Agrostis gigantea</i>	Red top grass	FACW	H
<i>Alisma subcordatum</i>	American water plantain	OBL	H
<i>Alopecurus arundinaceus</i>	Creeping meadow foxtail	FACW	H
<i>Apocynum cannabinum</i>	Indian hemp	FAC	H
<i>Asclepias syriaca</i>	Common milkweed	UPL	H
<i>Bromus inermis</i>	Smooth brome grass	UPL	H
<i>Carex utriculata</i>	Northwest territory sedge	OBL	H
<i>Cirsium floydmanii</i>	Flodman's thistle	FAC	H
<i>Convolvulus arvensis</i>	Field bindweed	UPL	H
<i>Eleocharis palustris</i>	Common spikerush	OBL	H
<i>Elymus canadensis</i>	Canada wildrye	FACU	H
<i>Elymus repens</i>	Quackgrass	FACU	H
<i>Elymus tachycaulus</i>	Slender wild rye	FACU	H
<i>Euphorbia esula</i>	Leafy spurge	UPL	H
<i>Hordeum jubatum</i>	Foxtail barley	FACW	H
<i>Juncus interior</i>	Inland rush	FACW	H
<i>Juncus torreyi</i>	Torey's rush	FACW	H
<i>Krigia virginica</i>	VA dwarf dandelion	FACU	H
<i>Liatris ligulistylis</i>	Blazing star	FAC	H
<i>Mentha arvensis</i>	Field mint	FACW	H
<i>Nassella viridula</i>	Green needle grass	UPL	H
<i>Panicum virgatum</i>	Switchgrass	FAC	H
<i>Phalaris arundinacea</i>	Reed canary grass	FACW	H
<i>Plantago major</i>	Common plantain	FAC	H
<i>Populus deltoides</i>	Cottonwood	FAC	T
<i>Rosa arkansana</i>	Prairie wild rose	FACU	Sh
<i>Rumex crispus</i>	Curly dock	FAC	H
<i>Solidago altissima</i>	Tall goldenrod	FACU	H
<i>Solidago canadensis</i>	Canada goldenrod	FACU	H
<i>Solidago gigantea</i>	Late goldenrod	FAC	H
<i>Symphoricarpos occidentalis</i>	Western snowberry	UPL	Sh
<i>Sympotrichum ericoides</i>	Heath aster	FACU	H
<i>Thlaspi arvense</i>	Field pennycress	FACU	H
<i>Typha angustifolia</i>	Narrowleaf cattail	OBL	H
<i>Typha latifolia</i>	Broadleaf cattail	OBL	H
<i>Vicia americana</i>	American purple vetch	FACU	H

Obl = obligate; FAC = facultative; FACW =facultative wetland; FACU=facultative upland; UPL =upland;

H = herbaceous; Sh = shrub

5.0 CONCLUSIONS

Wetland delineation field surveys were conducted on 217 ac in the southwest corner of GFAFB in June and July 2013. The resulting effort identified 32 wetlands totaling 23.795 ac within the project boundary. Of the 23.795 ac of wetlands delineated, 11 of the Jurisdictional wetlands, totaling 14.069 ac, exhibited a physical connection to wetlands that had been identified as jurisdictional in previous studies (GFAFB 2012) and eventually connected to downstream TNWs. No physical connection to other wetlands was

observed for the remaining 21 wetlands mapped in the project area which totaled 9.726 ac. These wetlands were determined to be non-jurisdictional by the USACE (**Appendix C**). In comparison, the 2004 planning-level wetland report identified 26 wetlands equaling 13.68 acres within the project area. Many of the wetlands from 2004 were enlarged in 2013 or combined to make larger wetlands. An additional 15 wetlands were identified within the project area in 2013.

The results of the 2013 field surveys identify wetlands and potential connectivity to TNW that had not previously been identified at GFAFB. This is due in large part because the previous investigation was an assessment over a large portion of GFAFB and was not intended to provide detailed, site-specific information. In the project area, the two large ditches, the hay lease subsection, and the road perimeters are annually mowed. The remaining acreage with various wetlands is left unmowed and idle for conservation purposes (approximately 110 ac). The INRMP labels a large section of this area as a significant habitat/conversation restoration area (INRMP Figure 5-8) and it is also used for recreational deer archery hunting. In 2011, the southern part of the conservation area was tilled/reseeded in a one-time event. The area is currently managed for noxious and invasive weeds by spot-spraying applicable herbicides. The hay lease is used as a conservation management tool to generate income that is further utilized for conservation projects. Birds are protected in this area because mowing is not authorized until after July 15th. The project area that is actively controlled for bird aircraft strike hazard (BASH) is located inside the airfield fence and the area between the alpha pad wall and the road. Areas inside the airfield fence are mowed earlier when possible regarding seasonal weather conditions in an effort to support BASH needs.

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**Waters and Wetlands Delineation Report
Proposed Business Park, Grand Forks Air Force Base**

APPENDICES

**Waters and Wetlands Delineation Report
Proposed Business Park, Grand Forks Air Force Base**

APPENDIX A

WETLAND DATA SHEETS AND REPRESENTATIVE PHOTOGRAPHS

The data sheets make the file too large to transfer by email. They will be included in any CD or hardcopy version of the report or EA.

APPENDIX B

WEB SOIL SURVEY FOR GRAND FORKS PROJECT AREA



United States
Department of
Agriculture



NRCS
Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Grand Forks County, North Dakota



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://soils.usda.gov/sqi/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<http://offices.sc.egov.usda.gov/locator/app?agency=nrcc>) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

Custom Soil Resource Report

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



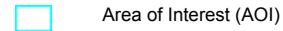
Map Scale: 1:8,830 if printed on A size (8.5" x 11") sheet.



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)



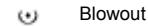
Area of Interest (AOI)

Soils



Soil Map Units

Special Point Features



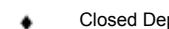
Blowout



Borrow Pit



Clay Spot



Closed Depression



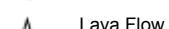
Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



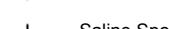
Miscellaneous Water



Perennial Water



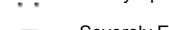
Rock Outcrop



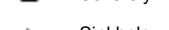
Saline Spot



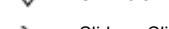
Sandy Spot



Severely Eroded Spot



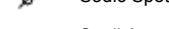
Sinkhole



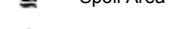
Slide or Slip



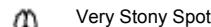
Sodic Spot



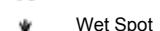
Spoil Area



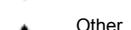
Stony Spot



Very Stony Spot

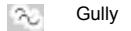


Wet Spot



Other

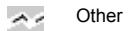
Special Line Features



Gully

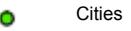


Short Steep Slope



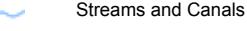
Other

Political Features



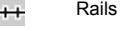
Cities

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

MAP INFORMATION

Map Scale: 1:8,830 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: UTM Zone 14N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota

Survey Area Data: Version 16, Apr 26, 2012

Date(s) aerial images were photographed: 6/24/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Grand Forks County, North Dakota (ND035)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I155A	Grimstad fine sandy loam, 0 to 2 percent slopes	24.1	10.6%
I157A	Antler, saline-Mustinka silty clay loams, 0 to 2 percent slopes	1.5	0.7%
I199A	Antler-Mustinka silt loams, 0 to 2 percent slopes	53.0	23.3%
I400A	Gilby loam, 0 to 1 percent slopes	144.6	63.6%
I906F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	4.0	1.8%
Totals for Area of Interest		227.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Grand Forks County, North Dakota

I155A—Grimstad fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

Landscape: Lake plains
Elevation: 750 to 1,250 feet
Mean annual precipitation: 19 to 24 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 110 to 135 days

Map Unit Composition

Grimstad and similar soils: 85 percent
Minor components: 15 percent

Description of Grimstad

Setting

Landform: Deltas
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy outwash over loamy till

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.9 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Moderate (about 8.2 inches)

Interpretive groups

Farmland classification: All areas are prime farmland
Land capability (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: Limy Subirrigated (R056XY087ND)
Other vegetative classification: Subirrigated (G056XY700ND)

Typical profile

0 to 9 inches: Fine sandy loam
9 to 22 inches: Loamy fine sand
22 to 32 inches: Loamy fine sand
32 to 60 inches: Loam

Minor Components

Arveson

Percent of map unit: 10 percent
Landform: Deltas
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Meadow (R056XY102ND)
Other vegetative classification: Wet (G056XY900ND)

Ulen

Percent of map unit: 5 percent
Landform: Deltas
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Limy Subirrigated (R056XY087ND)
Other vegetative classification: Subirrigated (G056XY700ND)

I157A—Antler, saline-Mustinka silty clay loams, 0 to 2 percent slopes

Map Unit Setting

Landscape: Lake plains
Elevation: 750 to 1,250 feet
Mean annual precipitation: 19 to 24 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 110 to 135 days

Map Unit Composition

Antler, moderately saline, and similar soils: 60 percent
Mustinka and similar soils: 25 percent
Minor components: 15 percent

Description of Antler, Moderately Saline

Setting

Landform: Till-floored lake plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty lacustrine deposits over loamy till

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 18 to 48 inches

Custom Soil Resource Report

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 6 percent
Maximum salinity: Slightly saline to moderately saline (8.0 to 15.9 mmhos/cm)
Sodium adsorption ratio, maximum: 10.0
Available water capacity: Moderate (about 6.6 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: Saline Lowland (R056XY089ND)
Other vegetative classification: Saline (G056XY895ND)

Typical profile

0 to 12 inches: Silty clay loam
12 to 15 inches: Clay loam
15 to 25 inches: Clay loam
25 to 28 inches: Clay loam
28 to 35 inches: Clay loam
35 to 60 inches: Clay loam

Description of Mustinka

Setting

Landform: Till-floored lake plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty and clayey glaciolacustrine deposits and/or calcareous loamy till

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.6 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: Clayey (R056XY084ND)
Other vegetative classification: Clayey Subsoil (G056XY210ND)

Typical profile

0 to 14 inches: Silty clay loam
14 to 24 inches: Silty clay
24 to 36 inches: Silty clay loam

Custom Soil Resource Report

36 to 80 inches: Clay loam

Minor Components

Antler

Percent of map unit: 5 percent
Landform: Till-floored lake plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Limy Subirrigated (R056XY087ND)
Other vegetative classification: Subirrigated (G056XY700ND)

Lankin

Percent of map unit: 5 percent
Landform: Till-floored lake plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R056XY094ND)
Other vegetative classification: Overflow (G056XY500ND)

Winger, moderately saline

Percent of map unit: 5 percent
Landform: Till-floored lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Saline Lowland (R056XY089ND)
Other vegetative classification: Saline (G056XY895ND)

I199A—Antler-Mustinka silt loams, 0 to 2 percent slopes

Map Unit Setting

Landscape: Lake plains
Elevation: 750 to 1,250 feet
Mean annual precipitation: 19 to 24 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 110 to 135 days

Map Unit Composition

Antler and similar soils: 55 percent
Mustinka and similar soils: 30 percent
Minor components: 15 percent

Description of Antler

Setting

Landform: Till-floored lake plains

Custom Soil Resource Report

Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty lacustrine deposits over loamy till

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.9 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: High (about 10.7 inches)

Interpretive groups

Farmland classification: Prime farmland if drained
Land capability (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Limy Subirrigated (R056XY087ND)
Other vegetative classification: Subirrigated (G056XY700ND)

Typical profile

0 to 12 inches: Silt loam
12 to 15 inches: Clay loam
15 to 25 inches: Clay loam
25 to 28 inches: Clay loam
28 to 35 inches: Clay loam
35 to 60 inches: Clay loam

Description of Mustinka

Setting

Landform: Till-floored lake plains
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty and clayey glaciolacustrine deposits and/or calcareous loamy till

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 10.6 inches)

Interpretive groups

Farmland classification: Prime farmland if drained
Land capability (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: Clayey (R056XY084ND)
Other vegetative classification: Clayey Subsoil (G056XY210ND)

Typical profile

0 to 14 inches: Silt loam
14 to 24 inches: Silty clay
24 to 36 inches: Silty clay loam
36 to 80 inches: Clay loam

Minor Components

Winger

Percent of map unit: 5 percent
Landform: Till-floored lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: Wet Meadow (R056XY102ND)
Other vegetative classification: Wet (G056XY900ND)

Lankin

Percent of map unit: 5 percent
Landform: Till-floored lake plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Loamy (R056XY094ND)
Other vegetative classification: Overflow (G056XY500ND)

Antler, moderately saline

Percent of map unit: 5 percent
Landform: Till-floored lake plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Saline Lowland (R056XY089ND)
Other vegetative classification: Subirrigated (G056XY700ND)

I400A—Gilby loam, 0 to 1 percent slopes

Map Unit Setting

Landscape: Delta plains, lake plains, outwash plains, till plains
Elevation: 750 to 1,250 feet

Custom Soil Resource Report

Mean annual precipitation: 19 to 24 inches

Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 110 to 135 days

Map Unit Composition

Gilby and similar soils: 69 percent

Minor components: 31 percent

Description of Gilby

Setting

Landform: Till-floored lake plains

Landform position (three-dimensional): Rise, talus

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy glaciolacustrine deposits over loamy till

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 18 to 42 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 20 percent

Gypsum, maximum content: 3 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 3.9 mmhos/cm)

Sodium adsorption ratio, maximum: 2.0

Available water capacity: High (about 10.7 inches)

Interpretive groups

Farmland classification: All areas are prime farmland

Land capability (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: Limy Subirrigated (R056XY087ND)

Other vegetative classification: Subirrigated (G056XY700ND)

Typical profile

0 to 10 inches: Loam

10 to 24 inches: Silt loam

24 to 60 inches: Clay loam

Minor Components

Borup

Percent of map unit: 13 percent

Landform: Depressions

Landform position (three-dimensional): Dip

Down-slope shape: Concave

Across-slope shape: Linear

Ecological site: Wet Meadow (R056XY102ND)

Other vegetative classification: Wet (G056XY900ND)

Hamerly

Percent of map unit: 5 percent

Landform: Flats

Landform position (three-dimensional): Talf, rise

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Limy Subirrigated (R056XY087ND)

Other vegetative classification: Subirrigated (G056XY700ND)

Mustinka

Percent of map unit: 5 percent

Landform: Depressions

Landform position (three-dimensional): Talf

Down-slope shape: Concave

Across-slope shape: Linear

Ecological site: Clayey (R056XY084ND)

Other vegetative classification: Clayey Subsoil (G056XY210ND)

Gilby, moderately saline

Percent of map unit: 5 percent

Landform: Flats

Landform position (three-dimensional): Rise, talf

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Saline Lowland (R056XY089ND)

Other vegetative classification: Saline (G056XY895ND)

Kratka

Percent of map unit: 3 percent

Landform: Depressions, depressions, flats, flats

Landform position (three-dimensional): Dip, talf

Down-slope shape: Concave, linear

Across-slope shape: Linear

Ecological site: Wet Meadow (R056XY102ND)

Other vegetative classification: Wet (G056XY900ND)

I906F—Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes

Map Unit Setting

Landscape: Delta plains, lake plains

Elevation: 750 to 1,250 feet

Mean annual precipitation: 19 to 24 inches

Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 110 to 135 days

Map Unit Composition

Orthents and similar soils: 30 percent

Orthents and similar soils: 25 percent

Aquents and similar soils: 25 percent

Urban land, highway: 20 percent

Description of Orthents

Setting

Landform position (three-dimensional): Side slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Glaciofluvial deposits and/or glaciolacustrine deposits

Properties and qualities

Slope: 3 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)

Depth to water table: About 36 to 60 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Gypsum, maximum content: 2 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)

Available water capacity: High (about 10.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: Loamy Overflow (R056XY088ND)

Other vegetative classification: Loam (G056XY100ND)

Typical profile

0 to 5 inches: Silty clay loam

5 to 9 inches: Silty clay loam

9 to 60 inches: Silty clay loam

Description of Aquents

Setting

Landform position (three-dimensional): Talf

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Fine-silty glaciolacustrine deposits over clayey glaciolacustrine deposits

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)

Depth to water table: About 0 to 18 inches

Frequency of flooding: None

Frequency of ponding: Frequent

Calcium carbonate, maximum content: 10 percent

Gypsum, maximum content: 2 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Available water capacity: High (about 11.2 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: Wet Meadow (R056XY102ND)
Other vegetative classification: Wet (G056XY900ND)

Typical profile

0 to 5 inches: Silty clay loam
5 to 9 inches: Silty clay loam
9 to 52 inches: Silt loam
52 to 81 inches: Silty clay

Description of Orthents

Setting

Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Glaciofluvial deposits and/or glaciolacustrine deposits

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: High (about 10.4 inches)

Interpretive groups

Farmland classification: Not prime farmland
Land capability (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Loamy Overflow (R056XY088ND)
Other vegetative classification: Loam (G056XY100ND)

Typical profile

0 to 5 inches: Silty clay loam
5 to 9 inches: Silty clay loam
9 to 60 inches: Silty clay loam

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APPENDIX C

US ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION

CENWO-OD-RND (1200a)

October 1, 2013

MEMORANDUM FOR: Grand Forks Air Force Base
ATTN: Scott Rudolf
Deputy Base Civil Engineer
319 CES/CD
525 Tuskegee Airmen Blvd
Grand Forks AFB, North Dakota 58205-6434

SUBJECT: Project Number NWO-2006-0449-BIS: Multi-Use Park at Grand Forks Air Force Base, North Dakota.

We have reviewed your request for Department of the Army (DA), US Army Corps of Engineers (Corps), jurisdictional determination (JD) for the above mentioned project. The project is located on the Grand Forks Air Force Base in Section 34, Township 152 North, Range 53 West, Grand Forks County, North Dakota.

Based on the information that you provided, we have determined that the following wetlands identified in your request, are not jurisdictional waters of the United States. See the attached **Isolated Wetland Table**. Therefore, proposed impacts to these wetlands will not be subject to DA regulatory authorities and no permit pursuant to Section 404 of the Clean Water Act is required from the Corps.

Although a DA permit is not required for impacts to non-jurisdictional wetlands this does not eliminate the need to obtain other Federal, state, tribal, and local approvals that may have regulatory jurisdiction over this project.

Additionally, the wetlands identified on the attached **Jurisdictional Wetland Table** are waters of the United States. If plans include the disposal of dredge or fill material into any of these jurisdictional wetland areas, in accordance with 33 C.F.R. 320-330, a Department of the Army permit (application enclosed) would be required prior to commencing construction activities associated with the proposed project that would result in fill to these waters of the United States.

An approved JD has been completed for the wetland areas identified in your request and is enclosed for your information. The JD may also be viewed at our website located at: <http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/NorthDakota.aspx>. The JD will be available on the website within 30 days. You may also request copies of the supporting materials the Corps used in determining this JD. If you are not in agreement with the JD, you may request an administrative appeal under Corps regulations found at 33 CFR 331. The Notification of Administrative Appeal Options and Request for Appeal (NAO-RFA) is attached. The request for appeal must be received within 60 days from the date of this correspondence (October 1, 2013). If you would like more information on the jurisdictional appeal process, contact this office. It is not necessary to submit a Request for Appeal if you do not object to the JD. The JD will be valid for a period of 5 years from the date of this letter.

The Omaha District, North Dakota Regulatory Office is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our website at <http://per2.nwp.usace.army.mil/survey.html>. If you do not have Internet access, you may call and request a paper copy of the survey that you can complete and return to us by mail or fax.

If you have any questions regarding this determination or jurisdiction, please feel free to contact Ms. Patsy Crooke of this office at telephone number (701) 255-0015 and reference project number **NWO-2006-0449-BIS**.

Sincerely,


for Daniel E. Cimarosti
Regulatory Program Manager
North Dakota

Enclosure

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): October 1, 2013

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Omaha, NWO-2006-0449-BIS, GFAFB Multi-Use Business Park

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: North Dakota County/parish/borough: Grand Forks City: Grand Forks Air Force Base

Center coordinates of site (lat/long in degree decimal format): Lat. SEE **ISOLATED WETLAND TABLE ATTACHED** N;
Long. W

Universal Transverse Mercator:

Name of nearest waterbody: **Isolated wetlands**

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: **None**

Name of watershed or Hydrologic Unit Code (HUC): **Turtle - 9020307**

Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
 Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

Office (Desk) Determination. Date: **September 11, 2013**
 Field Determination. Date(s): **10-13 June 2013, 08-14 July 2013, by Geo-Marine, Inc. and Jeffrey Donohoe & Associates (wetland delineators)**

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

Waters subject to the ebb and flow of the tide.
 Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply):¹

TNWs, including territorial seas
 Wetlands adjacent to TNWs
 Relatively permanent waters² (RPWs) that flow directly or indirectly into TNWs
 Non-RPWs that flow directly or indirectly into TNWs
 Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
 Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
 Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
 Impoundments of jurisdictional waters
 Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:

Non-wetland waters: linear feet: width (ft) and/or acres.
Wetlands: acres.

c. Limits (boundaries) of jurisdiction based on: Pick List

Elevation of established OHWM (if known):

2. Non-regulated waters/wetlands (check if applicable):³

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain: See attached excerpts from wetland delineation report for potentially isolated wetlands. Many of these 21 wetlands are located within excavated drainages that terminate at the project area boundary that do not connect to any downstream RPWs or TNWs. These wetlands are not used by interstate or foreign travelers for recreational or other purposes; do not support fish or shellfish that could be taken and sold in interstate or foreign commerce, and are not used for industrial purposes

¹ Boxes checked below shall be supported by completing the appropriate sections in Section III below.

² For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

³ Supporting documentation is presented in Section III.F.

by industries in interstate commerce. Based upon these principle considerations, it is determined that the subject wetlands are non-jurisdictional under the purview of Section 404 of the Clean Water Act.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is “adjacent”:

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are “relatively permanent waters” (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody⁴ is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: **Pick List**

Drainage area: **Pick List**

Average annual rainfall: inches

Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

- Tributary flows directly into TNW.
- Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.

Project waters are **Pick List** river miles from RPW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Project waters are **Pick List** aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain:

⁴ Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW⁵:

Tributary stream order, if known:

(b) General Tributary Characteristics (check all that apply):

Tributary is: Natural
 Artificial (man-made). Explain:
 Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):

Average width: feet

Average depth: feet

Average side slopes: Pick List.

Primary tributary substrate composition (check all that apply):

<input type="checkbox"/> Silts	<input type="checkbox"/> Sands	<input type="checkbox"/> Concrete
<input type="checkbox"/> Cobbles	<input type="checkbox"/> Gravel	<input type="checkbox"/> Muck
<input type="checkbox"/> Bedrock	<input type="checkbox"/> Vegetation. Type/% cover:	
<input type="checkbox"/> Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:

Presence of run/riffle/pool complexes. Explain:

Tributary geometry: Pick List

Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: Pick List

Estimate average number of flow events in review area/year: Pick List

Describe flow regime:

Other information on duration and volume:

Surface flow is: Pick List. Characteristics:

Subsurface flow: Pick List. Explain findings:

Dye (or other) test performed:

Tributary has (check all that apply):

Bed and banks
 OHWM⁶ (check all indicators that apply):
 clear, natural line impressed on the bank the presence of litter and debris
 changes in the character of soil destruction of terrestrial vegetation
 shelving the presence of wrack line
 vegetation matted down, bent, or absent sediment sorting
 leaf litter disturbed or washed away scour
 sediment deposition multiple observed or predicted flow events
 water staining abrupt change in plant community
 other (list):
 Discontinuous OHWM.⁷ Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

High Tide Line indicated by: Mean High Water Mark indicated by:
 oil or scum line along shore objects survey to available datum;
 fine shell or debris deposits (foreshore) physical markings;
 physical markings/characteristics vegetation lines/changes in vegetation types.
 tidal gauges
 other (list):

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain:

Identify specific pollutants, if known:

⁵ Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

⁶ A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

⁷Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- Riparian corridor. Characteristics (type, average width):
- Wetland fringe. Characteristics:
- Habitat for:
 - Federally Listed species. Explain findings:
 - Fish/spawn areas. Explain findings:
 - Other environmentally-sensitive species. Explain findings:
 - Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) **General Wetland Characteristics:**

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) **General Flow Relationship with Non-TNW:**

Flow is: **Pick List.** Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List.** Explain findings:

Dye (or other) test performed:

(c) **Wetland Adjacency Determination with Non-TNW:**

Directly abutting

Not directly abutting

Discrete wetland hydrologic connection. Explain:

Ecological connection. Explain:

Separated by berm/barrier. Explain:

(d) **Proximity (Relationship) to TNW**

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- Riparian buffer. Characteristics (type, average width):
- Vegetation type/percent cover. Explain:
- Habitat for:
 - Federally Listed species. Explain findings:
 - Fish/spawn areas. Explain findings:
 - Other environmentally-sensitive species. Explain findings:
 - Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately () acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

<u>Directly abuts? (Y/N)</u>	<u>Size (in acres)</u>	<u>Directly abuts? (Y/N)</u>	<u>Size (in acres)</u>
------------------------------	------------------------	------------------------------	------------------------

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs. Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:
2. Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs. Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:
3. Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW. Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. TNWs and Adjacent Wetlands. Check all that apply and provide size estimates in review area:
 TNWs: linear feet width (ft), Or, acres.
 Wetlands adjacent to TNWs: acres.
2. RPWs that flow directly or indirectly into TNWs.
 Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial.
 Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally.

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: linear feet width (ft).
- Other non-wetland waters: acres.

Identify type(s) of waters:

3. Non-RPWs⁸ that flow directly or indirectly into TNWs.

- Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

- Tributary waters: linear feet width (ft).
- Other non-wetland waters: acres.

Identify type(s) of waters:

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

- Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
- Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW.
- Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

- Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

- Wetlands adjacent to such waters, and when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.⁹

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

- Demonstrate that impoundment was created from "waters of the U.S.," or
- Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
- Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):¹⁰

- which are or could be used by interstate or foreign travelers for recreational or other purposes.
- from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- which are or could be used for industrial purposes by industries in interstate commerce.
- Interstate isolated waters. Explain:
- Other factors. Explain:

Identify water body and summarize rationale supporting determination:

⁸See Footnote # 3.

⁹ To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

¹⁰ Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: linear feet width (ft).
- Other non-wetland waters: acres.
 - Identify type(s) of waters:
- Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
 - Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- Lakes/ponds: acres.
- Other non-wetland waters: acres. List type of aquatic resource: .
- Wetlands: 21 wetlands totaling 9.726 acres (see Attached Isolated Wetland Table for Individual Wetland acres. acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- Lakes/ponds: acres.
- Other non-wetland waters: acres. List type of aquatic resource: .
- Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: [Wetland delineation report submitted by GFAFB for jd request](#).
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - Office concurs with data sheets/delineation report.
 - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps: .
- Corps navigable waters' study: .
- U.S. Geological Survey Hydrologic Atlas:
 - USGS NHD data.
 - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite scale & quad name: [USGS 1:24K Quad - Arvilla](#).
- USDA Natural Resources Conservation Service Soil Survey. Citation: References cited in wetland delineation report.
- National wetlands inventory map(s). Cite name: [USFWS/GIS - sources cited in wetland delineation report](#).
- State/Local wetland inventory map(s): .
- FEMA/FIRM maps: .
- 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- Photographs: Aerial (Name & Date):
 - or Other (Name & Date): .
- Previous determination(s). File no. and date of response letter: [Previous JDs: May 2005, Jan 2007, Nov 2012](#).
- Applicable/supporting case law: .
- Applicable/supporting scientific literature: .
- Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: [The wetland delineation report, with maps, tables and other data are available](#) .

Grand Forks Air Force Base Mixed Use Business Park

NWO-2006-0449-BIS

Isolated Wetland Table

Wetland ID	Lat/Long	Size/acres
FLS-02	47.93920 -97.412400	4.048
FLS-06	47.93750 -97.412600	0.730
FLS-08A	47.94037 -97.41143	0.144
FLS-08B	47.938703 -97.411423	0.030
FLS-08C	47.938462 -97.411686	0.143
FLS-08D	47.937481 -97.411681	0.012
FLS-09	47.934942 -97.410653	1.686
FLS-17	47.934088 -97.417482	0.042
FLS-64	47.941312 -97.419463	0.158
FLS-53	47.941699 -97.419576	0.504
FLS-54	47.939702 -97.416675	0.332
FLS-55	47.938957 -97.416856	0.079
FLS-56	47.938762 -97.417765	0.181
FLS-57	47.93697 -97.417056	0.153
FLS-58	47.936418 -97.416925	0.354
FLS-59	47.935609 -97.417436	0.130
FLS-60	47.935276 -97.416793	0.033
FLS-61	47.934519 -97.415179	0.743
FLS-62	47.93833 -97.41424	0.163
FLS-63	47.938989 -97.414562	0.041
FLS-65	47.942231 -97.410795	0.022
Total		9.726



4.2.2 *Potentially Isolated Wetlands*

Wetland FLS-02 is a 4.048-ac emergent marsh area that may be a relic prairie pothole. It is perhaps the deepest depressional wetland mapped within the entire project area. The center of this wetland contained up to 1.0 ft of water during the field survey, thus providing potential habitat for waterfowl. As noted for Wetland FLS-07, the following species were observed utilizing wetlands on and near the site: Northern pintail, gadwall, teal, and mallards.

Though there may be an overland flow connection between FLS-02 and Wetland FLS-08A during high rainfall events, no evidence of a physical connection to downstream RPW or TNWs was observed.

Wetlands FLS-09, FLS-08A, FLS-08B, FLS-08C, FLS-08D, and FLS-17 are linear wetlands that appear to have been caused by the construction of an earthen berm and the perimeter road. Surface water collects in these relatively flat or slightly depressional areas. If these areas were intended to support site drainage, they have not been maintained for that purpose and thus, do not connect to any downstream RPWs or TNWs. Together they comprise 2.057 ac of PEM wetlands. They have been disturbed by dirt road maintenance and wetland function is low relative to natural systems in the region.

Wetland FLS-61 is a 0.743-ac low prairie wetland. A flow connection was observed between this wetland and FLS-07 due to a 4-in rain event preceding the June 2013 field effort. During the July 2013 field effort no indication of a connection was noted and the wetland boundary did not extend between the two wetlands, which are separated by approximately 80 ft.

Wetland FLS-06 is a medium-sized depressional wetland (0.730 ac) that lies between FLS-02 and FLS-07. Creeping meadow foxtail was co-dominant with quackgrass, though narrowleaf cattail and reed canary grass were noted in wetter sections of the wetland. This area is not physically connected to neighboring wetlands.

Wetlands FLS-53, FLS-54, and FLS-58 are similarly sized and situated emergent, depressional wetlands that lack physical connections to neighboring wetland systems. They are roughly circular to oval in shape. The adjacent uplands were 0.25 – 1.0 ft higher in elevation than the depressional wetlands and typically lacked vegetation and hydrologic indicators as a result.

Wetlands FLS-52, FLS-55, FLS-56, FLS-57, FLS-59, FLS-60, and FLS-62 are all small to very small depressional emergent wetlands that lack physical connections to neighboring wetland systems. They range in size from 0.181 – 0.033 ac and are generally oval to circular in shape.

Wetlands FLS-17 and FLW-65 are located within excavated drainages that terminated at the project area boundary. Both are situated at drainage divides and neither was observed to have a contiguous physical connection to downstream RPW or TNWs.

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): October 1, 2013

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:NWO-2006-0449-BIS, GFAFB EUL -11 Jurisdictional Wetlands****

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State:North Dakota County/parish/borough:Grand ForksCity:Grand Forks Air Force Base

Center coordinates of site (lat/long in degree decimal format): Lat. See Attached Jurisdictional Wetland Table N; Long. W
Universal Transverse Mercator:

Name of nearest waterbody: **Turtle River**

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: **Turtle River**

Name of watershed or Hydrologic Unit Code (HUC): **Turtle - 9020307**

Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
 Check if other sites (e.g., offsite mitigation sites, disposal sites, etc...) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

Office (Desk) Determination. Date: **September 11, 2013**
 Field Determination. Date(s): **10-13, June 2013; July 8-14, 2013 by Geo-Marine, Inc.**

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "navigable waters of the U.S." within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [Required]

Waters subject to the ebb and flow of the tide.
 Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "waters of the U.S." within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [Required]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply):¹

TNWs, including territorial seas
 Wetlands adjacent to TNWs
 Relatively permanent waters² (RPWs) that flow directly or indirectly into TNWs
 Non-RPWs that flow directly or indirectly into TNWs
 Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
 Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
 Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
 Impoundments of jurisdictional waters
 Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:

Non-wetland waters: linear feet: width (ft) and/or acres.
Wetlands: **14.069** acres.

c. Limits (boundaries) of jurisdiction based on: **1987 Delineation Manual**

Elevation of established OHWM (if known):

2. Non-regulated waters/wetlands (check if applicable):³

Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain:

¹ Boxes checked below shall be supported by completing the appropriate sections in Section III below.

² For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

³ Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW: **Turtle River**.

Summarize rationale supporting determination: The Turtle River is on the Omaha District's approved TNW list;

<http://www.ndparks.com/parks/turtle-river-state-park>; [http://en.wikipedia.org/wiki/Turtle_River_\(North_Dakota\)](http://en.wikipedia.org/wiki/Turtle_River_(North_Dakota));
<http://www.ndtourism.com/arvilla/cabins/turtle-river-state-park>.

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent": the wetland delineation report submitted by GEO-marine, Inc., (wetland delineators for the project) contains field information that supports the adjacency determination.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody⁴ is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: **Pick List**

Drainage area: **Pick List**

Average annual rainfall: inches

Average annual snowfall: inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

- Tributary flows directly into TNW.
- Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.

Project waters are **Pick List** river miles from RPW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Project waters are **Pick List** aerial (straight) miles from RPW.

Project waters cross or serve as state boundaries. Explain:

⁴. Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW⁵:

Tributary stream order, if known:

(b) **General Tributary Characteristics (check all that apply):**

Tributary is: Natural
 Artificial (man-made). Explain:
 Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):

Average width: feet

Average depth: feet

Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

<input type="checkbox"/> Silts	<input type="checkbox"/> Sands	<input type="checkbox"/> Concrete
<input type="checkbox"/> Cobbles	<input type="checkbox"/> Gravel	<input type="checkbox"/> Muck
<input type="checkbox"/> Bedrock	<input type="checkbox"/> Vegetation. Type/% cover:	
<input type="checkbox"/> Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain:

Presence of run/riffle/pool complexes. Explain:

Tributary geometry: **Pick List**

Tributary gradient (approximate average slope): %

(c) **Flow:**

Tributary provides for: **Pick List**

Estimate average number of flow events in review area/year: **Pick List**

Describe flow regime:

Other information on duration and volume:

Surface flow is: **Pick List.** Characteristics:

Subsurface flow: **Pick List.** Explain findings:

Dye (or other) test performed:

Tributary has (check all that apply):

<input type="checkbox"/> Bed and banks	<input type="checkbox"/> OHWM ⁶ (check all indicators that apply):
<input type="checkbox"/> clear, natural line impressed on the bank	<input type="checkbox"/> the presence of litter and debris
<input type="checkbox"/> changes in the character of soil	<input type="checkbox"/> destruction of terrestrial vegetation
<input type="checkbox"/> shelving	<input type="checkbox"/> the presence of wrack line
<input type="checkbox"/> vegetation matted down, bent, or absent	<input type="checkbox"/> sediment sorting
<input type="checkbox"/> leaf litter disturbed or washed away	<input type="checkbox"/> scour
<input type="checkbox"/> sediment deposition	<input type="checkbox"/> multiple observed or predicted flow events
<input type="checkbox"/> water staining	<input type="checkbox"/> abrupt change in plant community
<input type="checkbox"/> other (list):	

Discontinuous OHWM.⁷ Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

<input type="checkbox"/> High Tide Line indicated by:	<input type="checkbox"/> Mean High Water Mark indicated by:
<input type="checkbox"/> oil or scum line along shore objects	<input type="checkbox"/> survey to available datum;
<input type="checkbox"/> fine shell or debris deposits (foreshore)	<input type="checkbox"/> physical markings;
<input type="checkbox"/> physical markings/characteristics	<input type="checkbox"/> vegetation lines/changes in vegetation types.
<input type="checkbox"/> tidal gauges	
<input type="checkbox"/> other (list):	

(iii) **Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain:

Identify specific pollutants, if known:

⁵ Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

⁶ A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

⁷Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- Riparian corridor. Characteristics (type, average width):
- Wetland fringe. Characteristics:
- Habitat for:
 - Federally Listed species. Explain findings:
 - Fish/spawn areas. Explain findings:
 - Other environmentally-sensitive species. Explain findings:
 - Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

 Wetland size: acres

 Wetland type. Explain:

 Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List.** Explain:

Surface flow is: **Pick List**

 Characteristics:

Subsurface flow: **Pick List.** Explain findings:

Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

Directly abutting

Not directly abutting

Discrete wetland hydrologic connection. Explain:

Ecological connection. Explain:

Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- Riparian buffer. Characteristics (type, average width):
- Vegetation type/percent cover. Explain:
- Habitat for:
 - Federally Listed species. Explain findings:
 - Fish/spawn areas. Explain findings:
 - Other environmentally-sensitive species. Explain findings:
 - Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately () acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

<u>Directly abuts? (Y/N)</u>	<u>Size (in acres)</u>	<u>Directly abuts? (Y/N)</u>	<u>Size (in acres)</u>
------------------------------	------------------------	------------------------------	------------------------

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:
2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:
3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
 TNWs: linear feet width (ft), Or, acres.
 Wetlands adjacent to TNWs: 14.069acres.
2. **RPWs that flow directly or indirectly into TNWs.**
 Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial.
 Tributaries of TNW where tributaries have continuous flow “seasonally” (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally.

Provide estimates for jurisdictional waters in the review area (check all that apply):

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters:

3. Non-RPWs⁸ that flow directly or indirectly into TNWs.

Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):

Tributary waters: linear feet width (ft).

Other non-wetland waters: acres.

Identify type(s) of waters:

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.

Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW:

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.⁹

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

Demonstrate that impoundment was created from "waters of the U.S.," or
 Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
 Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):¹⁰

which are or could be used by interstate or foreign travelers for recreational or other purposes.
 from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
 which are or could be used for industrial purposes by industries in interstate commerce.
 Interstate isolated waters. Explain:
 Other factors. Explain:

Identify water body and summarize rationale supporting determination:

⁸See Footnote # 3.

⁹ To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

¹⁰ Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA Memorandum Regarding CWA Act Jurisdiction Following Rapanos.

Provide estimates for jurisdictional waters in the review area (check all that apply):

- Tributary waters: linear feet width (ft).
- Other non-wetland waters: acres.
 - Identify type(s) of waters:
- Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
 - Prior to the Jan 2001 Supreme Court decision in "SWANCC," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
- Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- Lakes/ponds: acres.
- Other non-wetland waters: acres. List type of aquatic resource:
- Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- Lakes/ponds: acres.
- Other non-wetland waters: acres. List type of aquatic resource:
- Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: [wetland delineation report submitted by wetland delineators for the project](#).
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - Office concurs with data sheets/delineation report.
 - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps:
- Corps navigable waters' study:
- U.S. Geological Survey Hydrologic Atlas:
 - USGS NHD data.
 - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite scale & quad name: [1:24K USGS Quad - Arvilla](#).
- USDA Natural Resources Conservation Service Soil Survey. Citation: [Wetland delineation report contains references for soil data and actual field data collected \(noted on field forms\)](#).
- National wetlands inventory map(s). Cite name: [USFWS/GIS](#).
- State/Local wetland inventory map(s):
- FEMA/FIRM maps:
- 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- Photographs: Aerial (Name & Date): [Google Earth](#); aerials provided by agent in delineation report.
 - or Other (Name & Date): [Wetland photos from delineation](#).
- Previous determination(s). File no. and date of response letter: [Previous JDs: May 2005, Jan 2007, Nov 2012](#).
- Applicable/supporting case law:
- Applicable/supporting scientific literature:
- Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD: See Attached information; other supporting information available.

Grand Forks Air Force Base Mixed Use Business Park
NWO-2006-0449-BIS
Jurisdictional Wetland Table

Wetland ID	Lat/Long	Size/acres
FLS-01	47.9394 -97.411	1.149
FLS-07	47.9358 -97.4127	8.011
FLS-10	47.937871 -97.417455	3.650
FLS-13	47.933774 -97.412197	0.614
FLS-31A	47.940908 -97.40762	0.115
FLS-31B	47.941515 -97.40976	0.107
FLS-31D	47.935292 -97.408776	0.213
FLS-31F	47.938362 -97.409739	0.161
FLS-31G	47.939724 -97.409777	0.014
FLS-H	47.940594 -97.409714	0.023
FLS-I	47.970115 -97.409805	0.011
Total		14.069

4.2.1 Wetlands Physically Connected to Downstream Traditional Navigable Waters

Wetland FLS-07 is the single largest wetland mapped in the project area at 8.011 ac. This palustrine emergent (PEM) wetland area is underlain by Gilby loam and is comprised of several deeper pothole-like wetlands connected within a larger depressional area that drains south and develops into a system of linear wetlands along the roads. The linear wetland system collects drainage along the southern perimeter road flowing west and then north into a channel that roughly bisects the project area (Figure 12). This linear wetland drainage serves as a primary connection to the Turtle River, a TNW. The GFAFB Integrated Natural Resources Management Plan (INRMP) indicates that portions of the drainage system located north of the project area were previously delineated and provided Jurisdictional Determinations dated 23 May 2005 and 10 January 2007 (GFAFB 2011). Wetlands FLS-14 and FLW-65 from previous wetland reports (CH2M Hill 2004, 2007) are included in Wetland FLS-07.



Figure 12. Looking north along linear Wetland FLS-07.

The deepest portions of Wetland FLS-07 contained 0.25 to 0.5 ft of water during this field survey, thus providing potential habitat for waterfowl. The following species were observed utilizing wetlands on and near the site: Northern pintail (*Anas acuta*), gadwall (*A. strepera*), teal (*A. spp.*), and mallards (*A. platyrhynchos*).

Wetland FLS-10 is situated on the western boundary of the project area and extends east roughly 500 ft. It is a 3.650-ac PEM wetland that is contiguous with a linear wetland system that drains north and eventually converges with FLS-07. A few shrubs and saplings are present near the perimeter road (Figure 13).



Figure 13. Looking north along Wetland FLS-10.

Wetland FLS-01 is a linear wetland located within an excavated drainage and dominated by narrowleaf cattail (*Typha angustifolia*), creeping meadow foxtail (*Alopecurus arundinaceus*) foxtail barley (*Hordeum jubatum*), and reed canary grass (Figure 14). It is 1.149 ac that, under high rainfall conditions, flows north eventually exiting the project area through two concrete culverts. The drainage continues north to the Turtle River, a TNW. The GFAFB INRMP indicates that portions of the drainage system located north of the project area were previously delineated and determined to be jurisdictional by the USACE on 23 May 2005 and 10 January 2007 (GFAFB 2011).



Figure 14. Looking north along Wetland FLS-01.

Wetland FLS-13 is a 0.614-ac linear wetland within an excavated drainage located south of the perimeter road. Like most of the linear wetlands in the area, it is dominated by narrowleaf cattail, reed canary grass, and foxtail barley. A culvert connects FLS-13 to FLS-07 which follows the flow path north to the Turtle River as previously stated.

Wetlands FLS-31D, FLS-31F, FLS-31A, FLS-31B, FLS-31H, FLS-31G, and FLS-31I are linear wetlands that are separated from FLS-01 by underground culverts. The dominant vegetation cover varies from narrowleaf cattail and reed canary grass in the wetter sections to foxtail barley, Indian hemp (*Apocynum cannabinum*) and quackgrass (*Elymus repens*) in the more mesic sections. The drainage on the east side of the Alpha Ramp security wall is connected to FLS-01 via an underground culvert system flowing from east to west then north. As with most of the linear wetlands in this project area, wetland function is low relative to larger, natural systems in the region, although the wetlands do attenuate high runoff flows and perhaps help trap pollutants. These linear systems were either straightened and deepened from natural drainages or may have been created for drainage purposes in the past; nevertheless, these linear wetlands are currently contiguous with other jurisdictional wetlands.

4.2.2 Potentially Isolated Wetlands

Wetland FLS-02 is a 4.048-ac emergent marsh area that may be a relic prairie pothole. It is perhaps the deepest depressional wetland mapped within the entire project area. The center of this wetland contained up to 1.0 ft of water during the field survey, thus providing potential habitat for waterfowl. As noted for Wetland FLS-07, the following species were observed utilizing wetlands on and near the site: Northern pintail, gadwall, teal, and mallards.

APPENDIX E

SPECIES OF CONCERN OBSERVED ON GRAND FORKS AIR FORCE BASE (GFAFB)

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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Appendix E

Documented Species of Concern Observed on GFAFB (GFAFB 2011).

Scientific Name	Common Name	Habitat	List
BIRDS			
<i>Empidonax alnorum</i>	Alder Flycatcher	Low bushes in wet areas, swamps, around marshes, streamsides, near woods.	2
<i>Recurvirostra americana</i>	American Avocet	Ponds or lakes with exposed, sparsely vegetated shorelines where they nest in the open near water.	3
<i>Botaurus lentiginosus</i>	American Bittern	Bogs, marshes, and wet meadows.	1,3
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	Cliff ledges, mostly along rivers, lakes or in tall urban buildings.	1,2,3
<i>Pelecanus erythrorhynchos</i>	American White Pelican	Rivers, lakes, estuaries, and seacoasts.	3
<i>Scolopax minor</i>	American Woodcock	Forest with openings. Young forest and abandoned farmland mixed with forest.	2
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Lakes and rivers in forested areas.	1,2,3
<i>Dendroica castanea</i>	Bay-breasted Warbler	Boreal coniferous forest (especially spruce, balsam fir) with openings, occasionally adjoining second growth or deciduous scrub; in migration and winter, a variety of wooded habitats	4
<i>Chlidonias niger</i>	Black Tern	Shallow freshwater marshes with emergent vegetation, including prairie slough, lake margins and occasionally river or island edges.	1,2,3
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	Groves of trees, forest edges, and thickets, frequently associated with water.	1,3
<i>Dolichonyx oryzivorus</i>	Bobolink	Variety of grasslands including tall grass prairie, hay-land, and retired cropland.	3
<i>Wilsonia canadensis</i>	Canada Warbler	Low trees, shrubs, underbrush.	2,4
<i>Aythya valisineria</i>	Canvasback	Semi-permanent wetlands and other deep waters. Nests over water in dense stands of vegetation.	3
<i>Calcarius ornatus</i>	Chestnut-collared Longspur	Mixed-grass and short grass uplands. Open prairie and cropland.	1,2,3
<i>Dendroica pensylvanica</i>	Chestnut-sided Warbler	Fairly dense upland thickets of young or second-growth deciduous forest composed of small trees and tall shrubs.	2
<i>Bucephala clangula</i>	Common Goldeneye	Wetlands, lakes, and rivers bordered by forests mature enough to provide suitable tree cavities.	2
<i>Mergus merganser</i>	Common Merganser	Freshwater lakes and flowing rivers.	2
<i>Sterna hirundo</i>	Common Tern	Isolated, sparsely vegetated islands in large lakes, reservoirs, shallow impoundments.	2
<i>Corvus corax</i>	Common Raven	Along rivers and streams.	2

**Appendix E (continued). Documented Species of Concern Observed on GFAFB
(GFAFB 2011).**

Scientific Name	Common Name	Habitat	List
<i>Accipiter cooperii</i>	Cooper's Hawk	Brushy, deciduous woodlands, adjoining wood margins along major streams, ravines, escarpments.	2
<i>Spiza americana</i>	Dickcissel	Alfalfa, sweet clover, and other brushy grasslands.	1,3,4
<i>Sialia sialis</i>	Eastern Bluebird	Forest edge, open woodland interspersed with or adjacent to grazed or mowed grasslands. Margins of floodplain and upland deciduous forest.	2
<i>Buteo regalis</i>	Ferruginous Hawk	Flat and rolling prairie, grasslands, sagebrush country.	2,3
<i>Sterna forsteri</i>	Forster's Tern	Large marshes with extensive areas of emergent vegetation.	2
<i>Larus pipixcan</i>	Franklin's Gull	Lakes, marshes, ponds and rivers.	2,3
<i>Aquila chrysaetos</i>	Golden Eagle	Badland buttes and adjoining native prairie.	2,3
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	Open grasslands and prairies with patches of bare ground.	1,3
<i>Perisoreus canadensis</i>	Gray Jay	Coniferous and mixed coniferous-deciduous forests.	2
<i>Butorides virescens</i>	Green Heron	In or near woodland borders of streams, oxbows, ponds, and lakes.	2
<i>Zonotrichia querula</i>	Harris's Sparrow	Breeds at edge of boreal forest and tundra. Winters along hedgerows, shelterbelts, agricultural fields, weed patches, and pastures.	4
<i>Lophodytes cucullatus</i>	Hooded Merganser	Wood bordered rivers and large creeks, and adjoining oxbows, with large populations of small fish.	2
<i>Podiceps auritus</i>	Horned Grebe	Shallow freshwater ponds and marshes.	1,3
<i>Calamospiza melanocorys</i>	Lark Bunting	Plains, prairies, meadows and sagebrush.	3
<i>Ammodramus leconteii</i>	LeConte's Sparrow	Fens, lowland tracts of tall grass prairie and wet meadows.	2,3
<i>Asio otus</i>	Long-eared Owl	Dense vegetation adjacent to grasslands or shrublands, also open forests.	2
<i>Limosa fedoa</i>	Marbled Godwit	Wetlands include intermittent streams and various types of ponds and lakes.	1,2,3
<i>Falco columbarius</i>	Merlin	Natural groves of trees, including adjoining wood margins, and nearby tracts of brush-land, grassland, and fields.	2
<i>Ammodramus nelson</i>	Nelson's Sparrow [Formerly Nelson's Sharp-tailed Sparrow (Chesser et al. 2009)]	Freshwater prairie marshes and meadows.	1,2,3,4
<i>Accipiter gentilis</i>	Northern Goshawk	Coniferous dominated hardwoods.	2
<i>Circus cyaneus</i>	Northern Harrier	Nests in upland grasses usually near water.	3
<i>Anas acuta</i>	Northern Pintail	Freshwater lakes and pond. Stock-watering ponds.	2,3

**Appendix E (continued). Documented Species of Concern Observed on GFAFB
(GFAFB 2011).**

Scientific Name	Common Name	Habitat	List
<i>Contopus cooperi</i>	Olive-sided Flycatcher	Forest and woodlands, especially in burned-over areas with standing dead trees in mixed coniferous-deciduous forest.	2,4
<i>Pandion haliaetus</i>	Osprey	Habitat associated with lakes and large rivers.	2
<i>Dryocopus pileatus</i>	Pileated Woodpecker	Late successional stages of coniferous or deciduous forest, also younger forests that have scattered, large, dead trees.	2
<i>Vireo philadelphicus</i>	Philadelphia Vireo	Breeds in early and mid-successional deciduous woods and parklands, especially among aspens, birches, alders, and ashes.	2
<i>Aythya americana</i>	Redhead	Semi-permanent wetlands and other deep waters where they nest over water in emergent vegetation.	3
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	Natural stands of mature deciduous trees along river bottoms, shelterbelts, wooded areas of towns and farmsteads, and sometimes over prairie. Nests in snags.	1,3,4
<i>Podiceps grisegena</i>	Red-necked Grebe	Freshwater or slightly brackish, permanent ponds and lakes.	2
<i>Euphagus carolinus</i>	Rusty Blackbird	Breeds in wet forests, including areas with fens, bogs, muskeg, and beaver ponds. Winters in swamps, wet woodlands, and pond edges.	4
<i>Piranga olivacea</i>	Scarlet Tanager	Rich, mature deciduous forests that occur on slopes of prominent hills and valley bluffs, and on well-drained floodplains of large streams.	2
<i>Cistothorus platensis</i>	Sedge Wren	Prefers wet meadows of tall grasses and sedges, with scattered shrubs.	3
<i>Tympanuchus phasianellus</i>	Sharp-tailed Grouse	Prairies that may contain scattered patches of small trees or shrubs such as buffaloberry.	3
<i>Limnodromus griseus</i>	Short-billed dowitcher	Breeds in muskegs of taiga to timberline and winters on coastal mudflats and brackish lagoons.	1
<i>Asio flammeus</i>	Short-eared owl	Prairie, marshes and fields in search of small mammals. Nest on the ground in prairies, hayfields, or even stubble fields.	1,3,4
<i>Tringa solitaria</i>	Solitary sandpiper	Ponds, bogs, wet swampy places, and woodland streams.	1
<i>Buteo swainsoni</i>	Swainson's hawk	Native prairie or cropland including thickets of natural tree growth or brush margins of native forested tracts.	1,2,3,4
<i>Melospiza georgiana</i>	Swamp sparrow	Fens, particularly those that contain stands of cattail or phragmites and scattered shrubs.	2

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

**Appendix E (continued). Documented Species of Concern Observed on GFAFB
(GFAFB 2011).**

Scientific Name	Common Name	Habitat	List
<i>Bartramia longicauda</i>	Upland Sandpiper	Grasslands, especially large blocks.	1,2,3
<i>Caprimulgus vociferus</i>	Whip-poor-will	Woods, especially near fields.	2
<i>Zonotrichia albicollis</i>	White-throated sparrow	Coniferous and mixed forests, with numerous openings with low, dense vegetation.	2
<i>Tringa semipalmata</i>	Willet	Semi-permanent ponds and lakes, seasonal ponds and lakes, permanent ponds and lakes, alkali ponds and lakes, intermittent streams.	2,3
<i>Empidonax traillii</i>	Willow Flycatcher	Breeds in moist, shrubby areas, often with standing or running water. Winters in shrubby clearings and early successional growth.	4
<i>Phalaropus tricolor</i>	Wilson's Phalarope	Shallow freshwater marshes in prairie and other open country.	3
<i>Coturnicops noveboracensis</i>	Yellow rail	Sedge meadows and grassy marshes.	1,2,3
MAMMALS			
<i>Martes pennanti</i>	Fisher	Dense lowland forests.	2,5
<i>Sorex arcticus</i>	Arctic shrew	Moist grassy openings in forested areas.	3
<i>Spermophilus richardsonii</i>	Richardson's ground squirrel	Prefers open grasslands, cultivated fields and pastures.	3
<i>Ursus americanus</i>	Black Bear	Forested and brushy areas.	2
AMPHIBIANS			
<i>Bufo hemiophrys</i>	Canada Toad	Shallow wetlands, streams and roadside ditches. Winters in burrows below frost line.	3
<i>Rana pipiens</i>	Northern Leopard Frog	Usually permanent water. In summer, inhabits wet meadows and fields.	2
PLANTS			
<i>Cypripedium candidum</i>	White Lady's Slipper	Low prairie, wet meadow.	2
<i>Cypripedium parviflorum var. parviflorum</i>	Lesser Yellow Lady's Slipper	Damp woods, fens, stream banks.	2
<i>Dicentra cucullaria</i>	Dutchman's Breeches	Rich eastern woodlands.	2
<i>Ribes cynosbati</i>	Eastern Prickly Gooseberry	Moist rich woods.	2

1—Birds of Conservation Concern 2008, US Fish and Wildlife, Division of Migratory Bird Management;

2—North Dakota Natural Heritage Program [critically imperiled (S1), imperiled (S2), rare or uncommon (S3), unranked (S?), and status unknown (SU), 2010];

3—North Dakota Fish and Game Department, Comprehensive Wildlife Conservation Strategy, 100 species of Conservation Priority, 2004;

4—Partners in Flight (PIF), Land Bird Conservation Plan, Watch List, 2004;

5—Living specimens have not been documented on base.

APPENDIX F

UNDERSTANDING NOISE

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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APPENDIX F

UNDERSTANDING NOISE

To understand noise and describe its effects on the natural and human environment, a basic description of sound and noise terminology is presented in this appendix.

Noise and Sound Metrics

Sound is a series of vibrations (energy) transmitted through a medium (such as air or water) that are perceived by a receiver (e.g., humans, animals). It is measured by accounting for the energy level represented by the amplitude (volume) and frequency (pitch) of those vibrations and comparing that to a baseline standard. As a sound wave moves through the atmosphere, a temporary increase in pressure occurs; it is the pressure change that is detected as sound. The magnitude of the pressure change is the loudness and the frequency of the temporary changes is the pitch.

The human ear can detect pressure differences over a wide range of sensitivities. For example, a whisper heard 2 meters away creates a pressure change from standard atmospheric pressure of approximately 0.0006 Pascals (Pa), whereas an M16 rifle at the firer's ear creates a change of 1,000 Pa. Although one event represents 1,666,666 times more energy than the other, both represent sounds that can be heard by a human ear. A method for readily comparing these vast pressure differences involves describing them in exponential rather than linear terms. This simplifies the units and more closely depicts the way humans actually perceive sound levels. The decibel (dB) is a logarithmic ratio of the increase in atmospheric pressure a sound event causes compared to a defined reference pressure, which happens to be the lowest detectable pressure recognized by the human ear (0.00002 Pa). The formula for calculating a decibel level is: $20 \log_{10} \{P/P_0\}$ where P is the pressure level of an event and P_0 is the reference pressure (0.00002 Pa). When using decibels to depict airborne sound pressure levels, 0 dB is the threshold of human hearing and exponential increases occur every 10 dB. An event that generates 60 dB of sound is 10 times louder than one that generates 50 dB. In the example above, the whisper (0.0006 Pa) translates to 29 dB and the M16 rifle shot (1,000 Pa) is 153 dB.

The sound pressure level represented by a given decibel value is usually adjusted to make it more relevant to sounds that the human ear hears especially well; for example, an "A-weighted" decibel (dB[A]) is derived by emphasizing mid-range frequencies to which the human ear responds especially well and de-emphasizing the lower and higher range frequencies. In addition to weighting based on frequency, sound levels are further differentiated by factoring in the effect of time (duration) since sound levels normally vary in intensity and are not continuous.

The building block of noise metrics used in describing aircraft noise is the A-weighted sound level. It simply describes in terms of dB(A) a sound pressure level at any given moment in time. From this building block, several other metrics are derived.

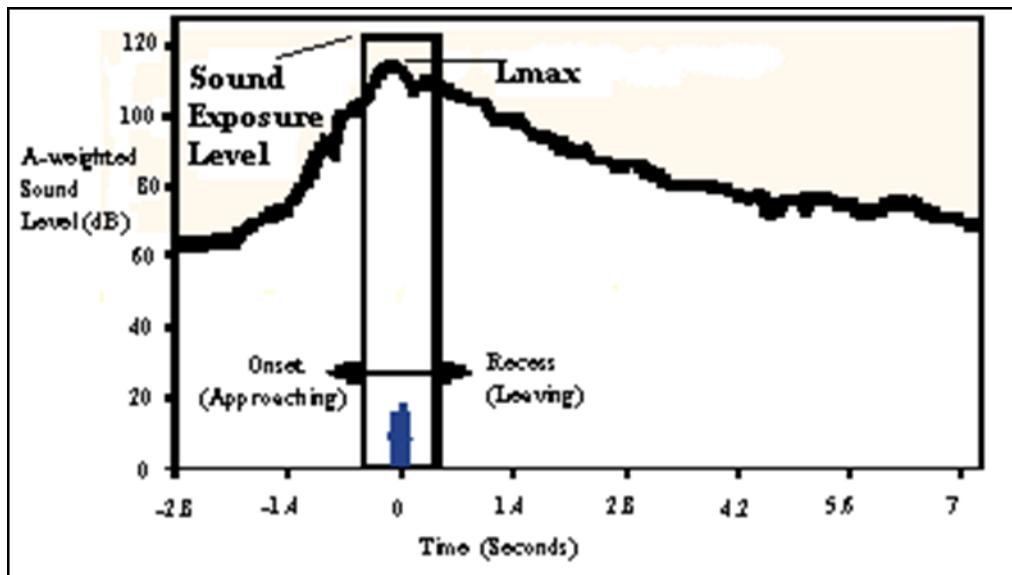
The maximum sound level (L_{max}) is the peak value of all the A-weighted sound levels that occurs during a noise event. The limitation of this metric for noise (annoyance) analysis is that peak sound level without a context of duration or time of day does not adequately address annoyance. For example, most people would agree that a single 140 dB L_{max} event lasting 3 seconds (an aircraft flyover) that occurs once per day around 1:00 PM is less annoying than a 95 dB L_{max} event (a jackhammer in a construction site) that lasts for 6 hours, every day and occurs at 11:00 PM.

The equivalent sound level (L_{eq}) reflects the average continuous sound. It is a metric that takes into account both intensity of an event and duration. The metric considers variations in sound magnitude over periods of time, sums them, and reflects, in a single value, the acoustic energy present during a specified time period. Common time periods for averaging are 1-, 8-, and 24-hour periods.

The sound exposure level (SEL) is a specific type of L_{eq} that describes a receiver's cumulative exposure over the course of an event and compresses that energy into a one-second period (**Figure E-1**). For noise events whose duration is greater than a second, the SEL will be greater than the L_{max} . Conversely, in events with durations shorter than a second, the SEL will be less than the L_{max} . SEL is a very useful metric for predicting short-term activity interruption or reaction by wildlife to a noise stimulus. It is used to allow direct comparison of events having varying intensities and durations, such as an aircraft overflight, by calculating SELs of those events. The fact that SEL is a cumulative metric means that louder events have greater SELs than do quieter events, and longer events have greater SELs than do shorter events.

SELs vary according to the aircraft and engine type, engine power setting, aircraft speed, and slant distance, that is, the distance between the aircraft and the observer (receptor). It is a very useful metric for prediction of activity interruption in humans and varied physiological responses in wildlife. Use of SEL allows direct comparison between sounds with varying levels and durations by converting them to exposure levels.

While the above metrics are useful at describing instantaneous, peak or even comparative noise events, they do not account for multiple event occurrences, the diminution of background noise during nighttime periods that tends to make otherwise unobjectionable sound pressure levels more annoying, or the increased annoyance expressed with events that occur during nighttime periods when many people are sleeping; therefore, an additional metric that accounts for cumulative (or repetitive) exposure, time of day, intensity and duration is used.



Source: Air Force 2000a

Figure F-1. Single noise event showing sound exposure level and maximum sound pressure (L_{max}) for a hypothetical overflight.

The day-night average A-weighted sound level (day-night sound level [DNL or L_{dn}]) describes a receiver's cumulative noise exposure from all events occurring during a 24-hour period; events occurring between 10:00 PM and 7:00 AM ("environmental night") are increased by 10 dB to account for greater nighttime sensitivity to noise events. If there were no noise events occurring during the environmental nighttime period, DNL and $L_{eq(24)}$ would be equal.

Because of the logarithmic nature of the decibel, a single nighttime event creates the same DNL as 10 identical events during the day. The DNL is used in this assessment when describing noise from aircraft. For temporary, intermittent noise events, the L_{max} or SEL is a more useful metric, and they are used for

assessing the effect to the noise environment from operation of construction equipment and similar activities.

The use of these noise metrics is chosen based on federal guidelines developed in order to be able to quantify noise and the reaction of those exposed to it in a community in a sound, objective, and scientifically valid fashion. The federal government established a working group to review the science of noise and recommend standards for its agencies to use when assessing the effects from noise. The Federal Interagency Committee on Noise (FICON) reviewed the existing science on the subject of urban, industrial, and aircraft noise, land use compatibility, and health and human safety, and validated the use of DNL as the appropriate metric for describing noise from aircraft operations and assessing its effects (FICON 1992). The DOD uses DNL as its common metric to describe noise exposure when describing and assessing noise from aircraft overflights, range operations, and other similar discontinuous but repetitive occurrences. Within the DOD, the AICUZ program assesses (among other things) noise related specifically to aircraft and range operations; it is a land-use compatibility program, but noise from aircraft operations is a major influence on land use compatibility.

The DNL metric has also been adopted by the US HUD, the FAA, and the USEPA as a common standard for assessing noise levels for compatibility with land uses, health and human safety, and effects on wildlife (**Figure E-2**).

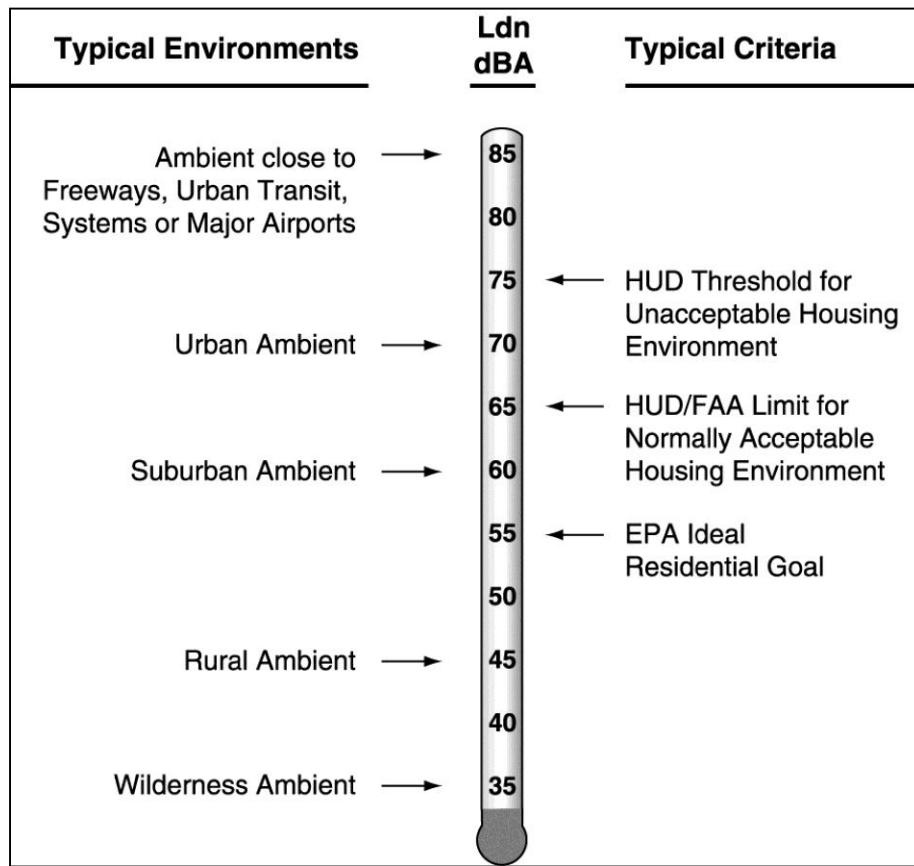


Figure F-2. Typical day-night average A-weighted sound level (DNL) values (FICON 1992).

Department of Defense Air Installation Compatible Use Zone Program

The DOD AICUZ program outlines compatible land uses by first predicting noise exposure zones or contours depicting lines of equal noise exposure that would result from normal operations at a particular place, and then by recommending land uses that are ordinarily considered compatible with the predicted

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noise exposure level for those locations contained within the noise contours (DOD 1977; Air Force 1998a). The Air Force AICUZ program predicts noise exposure by modeling aircraft operations and employing four bands of noise exposure: (1) 65 to 69 dB(A) DNL; (2) 70 to 74 dB(A) DNL; (3) 75 to 79 dB(A) DNL; and (4) 80 dB(A) DNL or more. Within these bands of noise exposure, certain land uses are considered acceptable or unacceptable. For example, residential uses are normally not considered compatible with a predicted noise exposure in excess of 65 DNL and an office use is not considered compatible in an area having a predicted noise exposure greater than 80 DNL (FICUN 1980).

Specific noise exposure contours are developed for each Air Force installation that has flying activities; these contours are released to the surrounding jurisdictions to guide their land use planning or are used to guide facilities planning on Air Force bases. Areas below the 65-dB(A) DNL are typically categorized as compatible for residential use. The Air Force's policy has been to implement, if feasible, noise level reduction (NLR) measures for on-base residential and public use buildings, with all new buildings being designed and constructed to comply with the appropriate NLR standards (Air Force 1978).

Apart from noise associated with the operation of aircraft, federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. Occupational safety and health regulations are a primary method of enforcing these guidelines and standards.

Hearing Loss

The potential for permanent hearing loss arises from direct exposure to noise on a regular, continuing long-term basis (16 hours a day for 40 years) to levels above 75 DNL. Based on an USEPA report (1974), hearing loss is not expected in people exposed to 75 DNL or less. The Federal Interagency Committee of Urban Noise (FICUN) states that hearing loss due to noise: (1) may begin to occur in people exposed to long-term noise at or above 75 DNL; (2) would not likely occur in people exposed to noise between 70 and 75 DNL; and (3) would not occur in people exposed to noise less than 70 DNL (FICUN 1980).

Noise Interference

Elevated noise levels can potentially interfere with speech, cause annoyance, or disturb sleep. Annoyance resulting from noise exposure is typically measured via community surveys where the level of tolerance can vary greatly among individuals (USEPA 1974). It is estimated that 13.5 percent of the population exposed to 65 DNL would be highly annoyed, while 37 percent would be highly annoyed if exposed to a 75 DNL. Research also indicates that the "type of neighborhood" a person inhabits influences their noise annoyance level, with instances of noise complaints being greater for those living in rural areas than in suburban or urban residential areas (USEPA 1974).

Interior noise levels are typically lower than exterior levels due to the attenuation of the sound energy by the structure, with the amount of noise level reduction provided by a building depending on the type of construction and the number of openings such as doors, windows, chimneys, and plumbing vents. The approximate reduction in interior noise is 15 dB(A) when windows are open and 25 dB(A) for closed windows (USEPA 1974).

**APPENDIX G
AIR QUALITY CALCULATIONS**

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

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AIR QUALITY CALCULATIONS

Assumptions from Project Description

For purposes of the impact analyses, it was assumed that one-third of the infrastructure and one-sixth of the buildings (roughly three buildings) would be constructed every two years—infrastructure would be completed in six years, whereas the buildings and the rest of the development in twelve years. The demolition of the Alpha Ramp wall and the connection of the taxiway to the runway would occur in years two and three, respectively.

Combustive Emissions

Step 1: Determine area of construction/demolition for each year (numbers in project description converted from square feet to acres). For demolition, assumed the width of 20-foot wall disturbed area would be 25 feet, width of perimeter road disturbed area would be 15 feet wide.

	Infrastructure Construction ¹	Building Construction	Taxiway Demolition	Taxiway Connection	Total disturbed area for year (acres)
Total (acres)	43.16	27.55	2.88	0.54	
Year 1	7.19	2.30			9.49
Year 2	7.19	2.30	2.88		12.38
Year 3	7.19	2.30		0.54	10.03
Year 4-6 ²	7.19	2.30			9.49
Year 7-12 ²		2.30			2.30

¹ Includes roads and parking areas. Utility construction would be done while ground is exposed so would not create additional area of disturbance.

² Years 4, 5, and 6 are each the total (9.49) and years 7 thru 12 are each the total (2.30)

Step 2: Get the emissions factors for the construction equipment (sources below table).

Equipment	No. Reqd per 10 acres ³	Days ⁴	NOx ³ (lb/day)	VOC ³ (lb/day)	CO ³ (lb/day)	PM10 ³ (lb/day)
Construction						
Land clearing/grubbing						
<i>Loader</i>	1	200	7.86	1.35	11.52	0.22
<i>Haul truck</i>	1	200	20.89	3.6	30.62	0.58
Trenching						
<i>Trencher</i>	1	200	5.82	1	8.53	0.16
<i>Loader</i>	1	200	7.86	1.35	11.52	0.22
Grading						
<i>Bulldozer</i>	1	200	29.40	3.66	25.09	1.17
<i>Grader</i>	1	200	10.22	1.76	14.98	0.28
<i>Water truck</i>	1	200	20.89	3.6	30.62	0.58
Concrete slab pouring						
<i>Cement truck</i>	1	200	20.89	3.6	30.62	0.58
Asphalt paving						
<i>Paving machine</i>	1	200	7.93	1.37	11.62	0.22
<i>Roller</i>	1	200	5.01	0.86	7.34	0.14
Architectural coating						
<i>Air compressor</i>	1	200	5.25	0.85	7.00	0.16

Equipment	No. Req'd per 10 acres ³	Days ⁴	NOx ³ (lb/day)	VOC ³ (lb/day)	CO ³ (lb/day)	PM10 ³ (lb/day)
Demolition						
Bulldozer	1	200	29.40	3.66	25.09	1.17
Loader	1	200	7.86	1.35	11.52	0.22
Haul truck	1	200	20.89	3.6	30.62	0.58
Water truck	1	200	20.89	3.6	30.62	0.58

³ Sacramento Metropolitan Air Quality Management District (SMAQMD). 2004. Guide to Air Quality

⁴ Although 9 months is 270 days, assumed that construction work was done at 22.25 days per month

Step 3: Multiply the number of days and the emission rate to determine the pounds of compounds emitted.

Equipment	Days	NOx (lb)	VOC (lb)	CO (lb)	PM10 (lb)
Construction					
Land clearing/grubbing					
Loader	1	200	1,572	270	2,304
Haul truck	1	200	4,178	720	6,124
Trenching					
Trencher	1	200	1,164	200	1,706
Loader	1	200	1,572	270	2,304
Grading					
Bulldozer	1	200	5,880	732	5,018
Grader	1	200	2,044	352	2,996
Water truck	1	200	4,178	720	6,124
Concrete slab pouring					
Cement truck	1	200	4,178	720	6,124
Asphalt paving					
Paving machine	1	200	1,586	274	2,324
Roller	1	200	1,002	172	1,468
Architectural coating					
Air compressor	1	200	1,050	170	1,400
Demolition					
Bulldozer	1	200	5,880	732	5,018
Loader	1	200	1,572	270	2,304
Haul truck	1	200	4,178	720	6,124
Water truck	1	200	4,178	720	6,124

Step 4: Total the amount of construction equipment emissions for each compound (lb), then divide by 2,000 lb/T for tons.

Combustion Equip Emission Total (lb)	44,212.00	7,042.00	57,462.00	1,372.00
Combustion Equip Emission Total (T)	22.11	3.52	28.73	0.69

Step 5: Based on whether the years' acreages are greater or less than 10, the year's construction/demolition equipment emissions are either 1 or 2 times the value above.

Acreage of disturbance		NOx (T)	VOC (T)	CO (T)	PM10 (T)
Year 1	9.49	22.11	3.52	28.73	0.69
Year 2	12.38	44.21	7.04	57.46	1.37
Year 3	10.03	22.11	3.52	28.73	0.69
Year 4-6 ²	9.49	22.11	3.52	28.73	0.69
Year 7-12 ²	2.30	22.11	3.52	28.73	0.69

² Years 4, 5, and 6 are each the total (9.49) and years 7 thru 12 are each the total (2.30)

Construction Commuter Emissions

Step 6: Calculate the emissions from the construction workers commuting to and from the project site. Because the daily trip miles are based on the total construction footprint, divide the emissions calculated by 12 for the 12-year buildup.

Assumptions:

Emissions from construction worker vehicle commute trips are estimated by multiplying total daily employee vehicle miles

Daily trip miles	504	8.4
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Number of construction days	200	
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grams/mile=1/453.59 lb/mile

	NOx	VOC	CO	PM10	CO ₂
Emissions factor (lb per mile)	0.00065484	0.00070227	0.00660353	0.00009185	1.10257205
453.59 grams/lb	0.29702995	0.31854484	2.99529655	0.04166180	500.11565464
Construction commuter emissions (lb)	29,941	32,109	301,926	4,200	50,411,658
Construction commuter emissions (T)	14.97	16.05	150.96	2.10	25,205.83
					2100.49

Construction commuter emissions (T/year)	1.25	1.34	12.58	0.17
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South Coast Air Quality Management District. 2007a. URBEMIS9 User Manual-Appendices. Accessed 27 May 2013 from <http://www.urbemis.com/software/URBEMIS9%20Users%20Manual%20Appendices.pdf>

South Coast Air Quality Management District. 2007b. EMFAC v. 2.3 Emissions factors for on-road vehicles. Retrieved 27 May 2013 from www.aqmd.gov/ceqa/handbook/onroad/onroad.html.

Fugitive dust emissions

		Acres/year	Project year
Step 7: Calculate fugitive dust emissions		9.49	1
		12.38	2
Construction	E=0.22 ⁵ *1 acre*9 months=	1.98 T per acre	10.03
Demolition	E=0.22 ⁵ *1 acre*9 months=	1.98 T per acre	9.49
			4-6
		2.30	7-12

⁵ The Midwest Research Institute has derived a value of 0.11 tons/acre/month, which converts to 10 lb per day, assuming 22 workdays per month. The California Air Resources Board (CARB) has reviewed this factor

Annual construction emissions totals

Step 8: Calculate total Construction/Demolition Project Emissions (add construction equipment emissions, construction worker commute emissions, and fugitive emissions).

Project Year	Acreage of disturbance	NOx (T)	VOC (T)	CO (T)	PM10 (T)
Year 1	9.49	23.35	4.86	41.31	19.65
Year 2	12.38	45.46	8.38	70.04	26.05
Year 3	10.03	23.35	4.86	41.31	20.72
Year 4-6 ²	9.49	23.35	4.86	41.31	19.66
Year 7-12 ²	2.30	23.35	4.86	41.31	5.41

Evaluate Project Emissions vs. County Total Emissions

Step 9: Because year 2 produces the highest annual emissions, compare year 2 construction/demolition

	NOx	VOC	CO	PM2.5	PM10
Grand Forks County ⁶	2,929	2,411	15,015	771	5,397
North Dakota ⁶	145,229	39,517	235,059	19,101	122,005
Total project emissions ³	45.46	8.38	70.04		26.05
annual emissions	1.55	0.35	0.47		0.48

⁶Data from USEPA 2013b

³Sacramento Metropolitan Air Quality Management District (SMAQMD). 2004. Guide to Air Quality

Scenario Year: **2014**

All model years in the range 1970 to 2014

Passenger Vehicles		Delivery Trucks	
CO	0.00660353	CO	0.01284321
NOx	0.00065484	NOx	0.01425162
ROG	0.00070227	ROG	0.00189649
SOx	0.00001069	SOx	0.00002754
PM10	0.00009185	PM10	0.00054929
PM2.5	0.00005939	PM2.5	0.00045519
CO2	1.10257205	CO2	2.79845465
CH4	0.00006312	CH4	0.00008798

From SCAQMD 2007b

Flight Operations

From the RPA FEIS air calculations appendix:

Global Hawk

Mode	time in mode (min)	fuel flow (lb/min)	power setting/ load factor	smoke number
take off	1.50	50.27	1.00	1.00
climb out	0.40	42.20	0.85	0.00
approach	2.60	15.48	0.30	0.00
taxi/idle	19.20	6.61	0.07	0.00

Emissions Indices (lb/1000 lb fuel)

	CO	NO _x	SO ₂	PM	VOC
take off	0.79	19.78	1.70	0.60	0.26
climb out	0.97	16.84	1.70	0.00	0.30
approach	3.80	7.22	1.70	0.00	0.72
taxi/idle	22.43	3.52	1.70	0.00	3.10

Emissions (lb/mode)

	CO	NO _x	SO ₂	PM	VOC
take off	0.060	1.491	0.128	0.045	0.020
climb out	0.014	0.242	0.024	0.000	0.004
approach	0.046	0.087	0.021	0.000	0.009
taxi/idle	0.199	0.031	0.015	0.000	0.028
Total emissions per sortie (lb)	0.319	1.851	0.188	0.045	0.060
Per annum (100/mo)	382.48	2,221.69	225.84	54.29	72.19
TPY	0.191	1.111	0.113	0.027	0.036

Predator

Mode	time in mode (min)	power setting/ load factor
take off	0.60	1.00
climb out	5.00	0.85
approach	4.60	0.30
taxi/idle	13.00	0.07

Emissions Factor (Load Factor*lb/min)

	CO ¹	NO _x	SO ₂	PM	VOC
lb/min (USAF 2010a)	0.87	0.023	0.001	0.001	0.042
(USAF 2009)	0.059	0.064		0.009	0.027
take off	0.059	0.023	0.001	0.001	0.042
climb out	0.050	0.020	0.001	0.001	0.036
approach	0.018	0.007	0.000	0.000	0.013
taxi/idle	0.004	0.002	0.000	0.000	0.003

1 The EF for CO from the Beddown EIS (USAF 2010a) seemed disproportionately high, so the EF used for the EA for MQ-1 Predator and MQ-9 Reaper Unmanned Aircraft System (UAS) Second Field Training Unit (FTU-2) Beddown, Holloman Air Force Base, New Mexico and Edwards Air Force Base, California was used instead

Emissions (lb/mode)

	CO	NO _x	SO ₂	PM	VOC
take off	0.035	0.014	0.001	0.001	0.025
climb out	0.249	0.098	0.004	0.004	0.179
approach	0.081	0.032	0.001	0.001	0.058
taxi/idle	0.053	0.021	0.001	0.001	0.038
Total emissions per sortie (lb)	0.418	0.164	0.007	0.007	0.300
Per annum (100/mo)	501.23	197.06	8.57	8.57	359.86
TPY	0.251	0.099	0.004	0.004	0.180

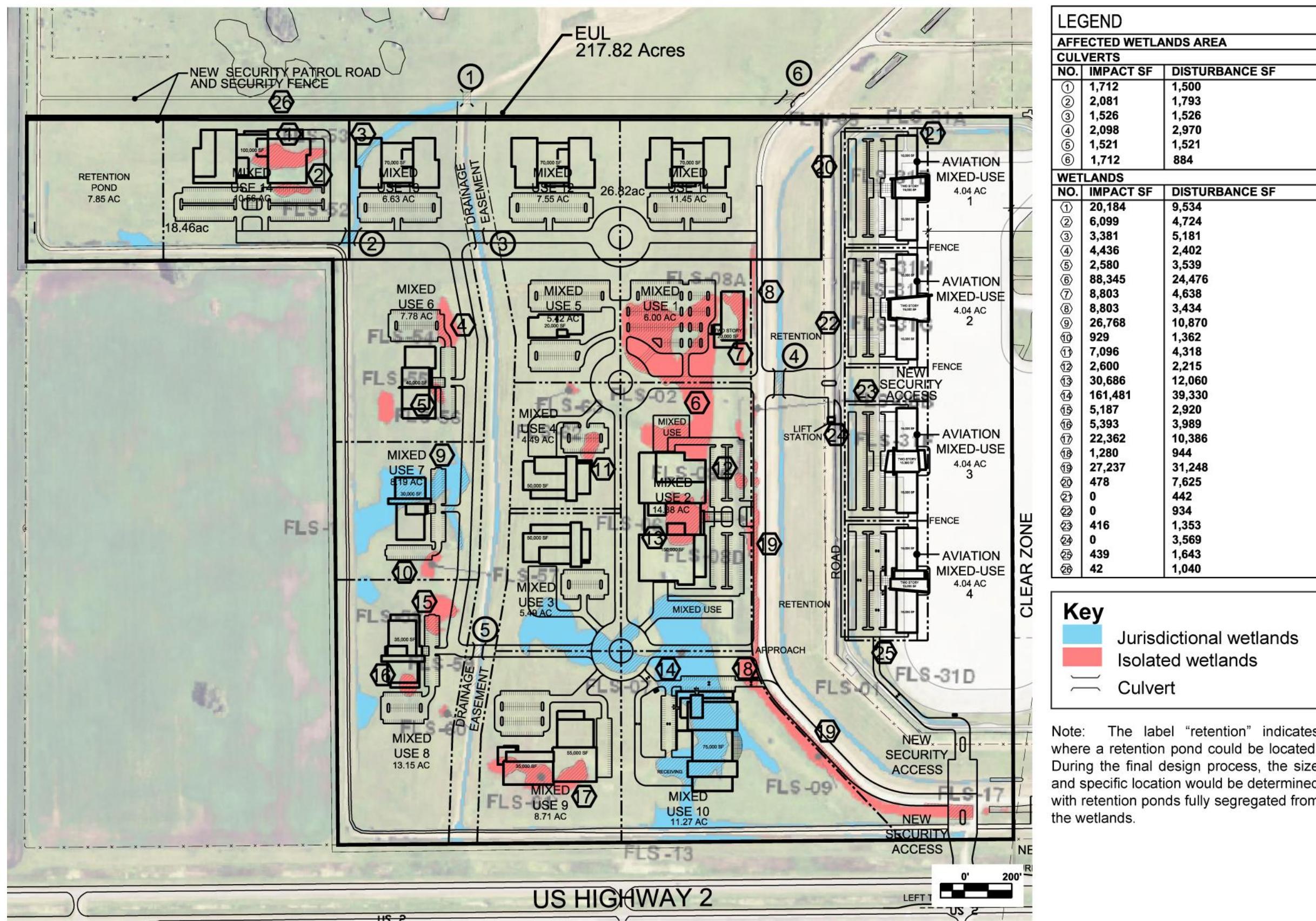
APPENDIX H

WETLAND IMPACT MAPS

**Environmental Assessment for an Enhanced Use Lease
Grand Forks Air Force Base, North Dakota**

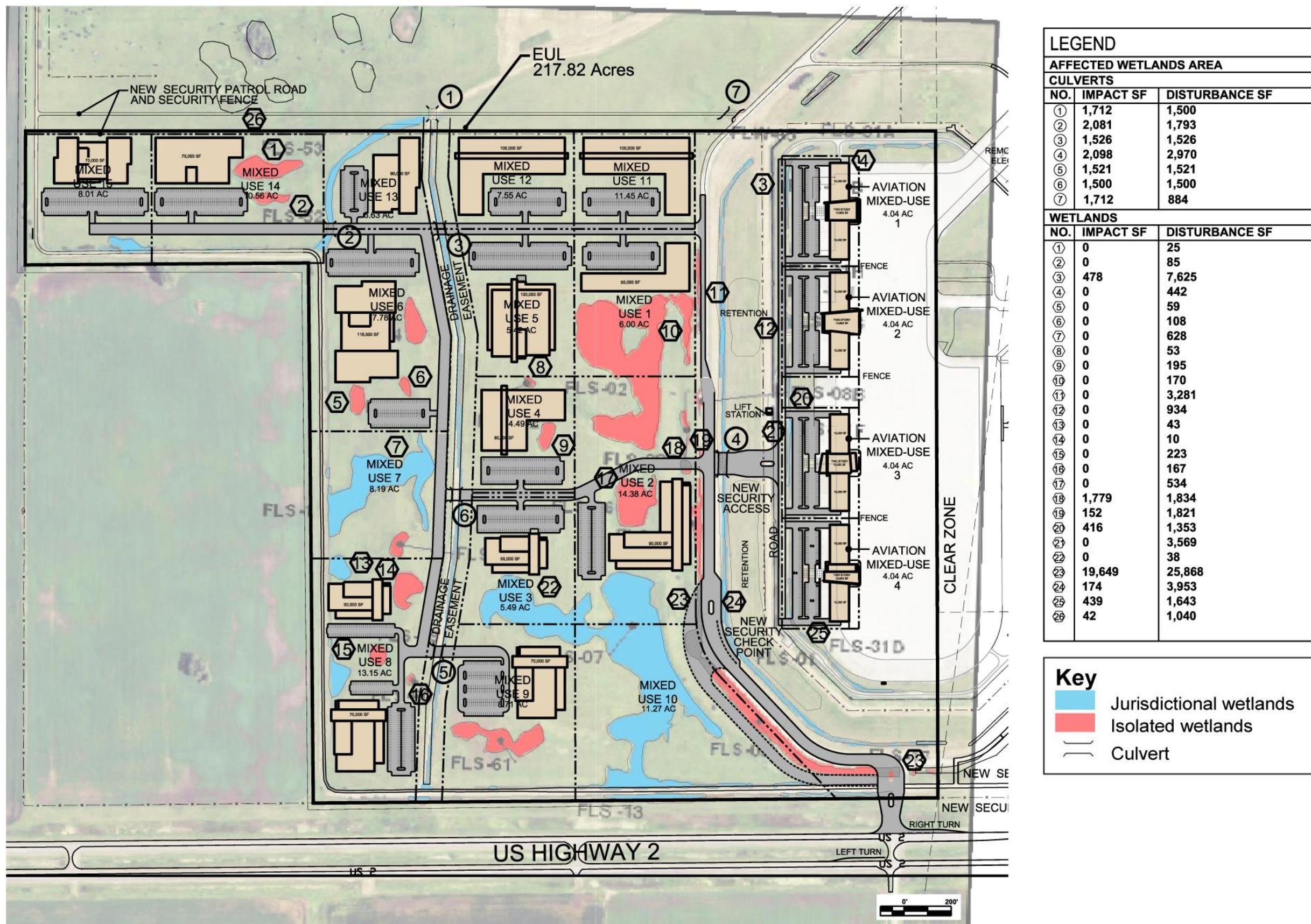
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Figure H-1: Individual Size of Impact Areas, Alternative 1



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Figure H-2: Individual Size of Impact Areas, Alternative 2



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